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# endangered & threatened species of new jersey

USDA, Soil Conservation Service Somerset, N.J.  
N.J. Department of Environmental Protection, Division of Fish, Game,  
and Wildlife, Endangered and Nongame Species Project



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Tremblay's Salamander, Barred Owl, Timber Rattlesnake—Z. Leszczynski;  
Pine Barrens Treefrog—N.J. Endangered and Nongame Species Project

# **ENDANGERED AND THREATENED SPECIES OF NEW JERSEY**

**A cooperative publication of**  
**New Jersey Department of Environmental Protection**  
**Division of Fish, Game and Wildlife**  
**Endangered and Nongame Species Project**  
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## FOREWORD

It gives us great pleasure and a measure of personal pride to make this book, "ENDANGERED AND THREATENED SPECIES OF NEW JERSEY," available to the public through the cooperation of the State Division of Fish, Game and Wildlife and the United States Department of Agriculture, Soil Conservation Service (SCS).

Both groups are frequently asked by the general public, school officials, professional engineers, biologists and others for specific information on endangered and threatened wildlife in New Jersey. Prior to this publication there was no single reference source that brought together knowledge about these species in our State. Since wildlife depend on the soil it is only logical that SCS and the Division integrate their management programs throughout the years to provide for the best possible land and water conservation uses.

Today, with the emphasis on protecting and managing the endangered and threatened wildlife, SCS and the Division's Endangered and Nongame Species Project group have worked closely again to produce this book, which provides factual information on wildlife species, and on habitats where they exist.

We hope you benefit from this joint presentation of our two agencies by increasing your knowledge and understanding of why we have wildlife which are endangered and threatened. Individuals can help protect species from extinction and rectify some of the environmental factors that adversely affect both the wildlife and human populations of New Jersey.



PLATER T. CAMPBELL  
USDA Soil Conservation Service



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## New Jersey State Endangered Species Legislation

### 23:2A-2 Legislative Findings and Declaration

The Legislature hereby finds and declares the following:

- a. That it is the policy of this State to manage all forms of wildlife to insure their continued participation in the ecosystem;
- b. That species or subspecies of wildlife indigenous to the State which may be found to be endangered should be accorded special protection (Section 23:2A-6) in order to maintain and to the extent possible enhance their numbers; and
- c. That the State should assist in the protection of species or subspecies of wildlife which are deemed to be endangered elsewhere by regulating the taking, possession, transportation, exportation, processing, sale or offer for sale or shipment within this State of species or subspecies of wildlife including those on any Federal endangered species list — L. 1973, c. 309, & 2, eff. Dec. 14, 1973.

### Definitions

- ENDANGERED—** An endangered species is one whose prospects for survival within the State are in immediate danger due to one or many factors—a loss of or change in habitat, over exploitation, predation, competition, disease. An endangered species requires immediate assistance or extinction will probably follow.
- THREATENED—** A threatened species is one that becomes endangered if conditions surrounding the species begin to or continue to deteriorate.



## SHORTNOSE STURGEON

*Acipenser brevirostrum*

**Distinguishing Characteristics:** The shortnose is small anadromous species of sturgeon seldom exceeding 3 feet (92 cm) in length. The snout is short, blunt, and rounded. The dorsal bony plates are weakly developed and separate from each other. The mouth is broad, nearly three quarters as wide as the space between the eyes. Coloration is dark above and whitish below. Its viscera are blackish. The shortnose sturgeon is often confused with the sympatric Atlantic sturgeon, a threatened species in New Jersey.

**Distribution and Habitat:** This fish ranges throughout the Atlantic seaboard rivers from New Brunswick to Florida. The Hudson, Delaware, and Connecticut Rivers also host populations of shortnose sturgeon. In addition to the Delaware River, specimens have been recorded in New Jersey from the Maurice River and Dividing Creek and from Little Creek, Delaware. The shortnose sturgeon is a benthic feeder but substrata and other specific habitat requirements have not been determined.

**Status:** Endangered (Federal and State). Development of our large tidal rivers into ports and industrial complexes with sizable urban populations and resultant water pollution problems has played a major role in the decline of this species. Specifically, the dissolved oxygen block caused by chemical pollutants in the lower Delaware River is detrimental to many anadromous fish populations. A slow growth rate and subsequent low reproductive rate of the shortnose sturgeon limits its capacity to withstand non-natural mortalities.

**Management Techniques and Protective Measures:** The shortnose sturgeon is afforded the protection that the endangered status entails on both the State and Federal levels. A questionnaire with an accompanying identification key was designed to gather data on the occurrence and distribution of the shortnose sturgeon in the Delaware and has been distributed to licensed net fishermen. However, few returns have been received to date.

**Recommendations:** Further research is necessary before an effective management plan can be formulated for this species. Although the



Shortnose Sturgeon

N. J. Endangered & Nongame Species Project

shortnose sturgeon populations of many of our major rivers have been studied, data on the abundance, distribution, movement, growth, age and sexual maturity, year class, strength, and habitat requirements are needed to accurately assess the status of the Delaware River population. Spawning areas must be located and feeding areas defined. To accomplish these ends, the census of net fishermen should be intensified, with participants supplied with logs and encouraged to fill them in faithfully. Tagging and recapture studies should be initiated and the substrata in suspected spawning areas sampled to determine habitat requirements. Anti-pollution enforcement and interstate cooperation in adopting uniform minimum mesh and catch sizes are recommended. Precautions to preclude the dumping of materials, particularly rubble, into coastal and estuarine waters must be taken, because hard surfaces are required for egg attachment.



The shortnose sturgeon breeding range occurs along the Delaware River and Bay and the East coast.

## ATLANTIC (SEA) STURGEON

*Acipenser oxyrinchus*



Atlantic Sturgeon

New York Zoological Society

**Distinguishing Characteristics:** The maximum length attained by the Atlantic sturgeon is in excess of 10 feet (3 m). The snout is long and pointed. The dorsal bony plates are well-developed and overlap. Its narrow mouth is less than half as wide as the space between the eyes.

**Distribution and Habitat:** Truly anadromous, the Atlantic sturgeon spawn in fresh water during May and June. They move into the upper reaches of the river waters that warm up during the spring months. They frequently constitute the incidental catch of commercial gill netters on the Delaware River. Sturgeons are bottom feeders and require a hard substrate for egg attachment. In the fall they return to the sea, where little is known of their movements. The Delaware and Raritan Rivers as well as a few other estuarine and river environments constitute critical habitat.

**Status:** Threatened (State). Little commercial fishing pressure has been exerted on this species since the 1930's, leaving other factors

The Atlantic sturgeon breeding range occurs along the Delaware River and Bay and the East coast.



suspect as causes in its decline. Loss of habitat, as in most cases of decline, is the chief problem. The pollution-caused dissolved oxygen block in the lower regions of the major rivers has inhibited upstream migration to areas warming the fastest after the winter.

**Management Techniques and Protective Measures:** In New Jersey it is illegal to take any sturgeon under 5 feet (1.5 m) in length. Declaration of this species as "threatened" affords it special consideration. It is hoped that pollution regulations will improve its habitat.

**Recommendations:** Interstate cooperation is required. An effort to collect data from commercial fishermen who fish offshore is necessary to assess their impact on river and estuarine sturgeon populations. A dual study of both the Atlantic and shortnose sturgeons is vital to formulating and implementing a comprehensive management plan.

## AMERICAN SHAD

*Alosa sapidissima*



American Shad

R. McDowell

**Distinguishing Characteristics:** The American shad is dark-bluish above and whitish-silvery on lower sides and belly. There are 1 to 3 rows of dark spots on its sides beginning just behind the upper part of the gill cover, with the first row always having more than 4 spots. The shad's body is compressed, with large, loosely attached scales. It reaches a length of up to 30 inches (76 cm) and a weight of up to 8 or 9 pounds (3.6 or 4 kg).

**Distribution and habitat:** This species is anadromous, spending most of its life in the ocean but ascending coastal rivers to spawn. The only "runs" which occur in New Jersey are in the boundary waters, i.e., the Delaware River and the Hudson River. Little spawning occurs in that portion of the Delaware River between



New Jersey and Pennsylvania, as the major spawning grounds are upstream in New York. A total of 19 shad spawning runs have become extinct in New Jersey along the major river systems.

**Status:** Threatened (State). This shad could almost be classed as a peripheral species in New Jersey. Once the in-state runs were wiped out, those races of shad making up those runs became extinct. The factors contributing to the shad's extinction in New Jersey were pollution, habitat loss, dams, and possible overfishing. Pollution is a critical problem in the Delaware River. Pollution blocks in the Delaware, together with spring river flow conditions, dictate how many shad will be produced in that river each year. Low flows make it very difficult for the adult shad to move upriver as the pollution block intensifies because there is less water in the river to dilute it.

**Management Techniques and Protective Measures:** Compliance with surface water quality standards will greatly improve the chances for fish passage. Stream blockages have been identified and efforts launched toward providing fish ladders at these sites. One fish ladder is already in operation at Lake Shennandoah in Ocean County. Stocking of adult shad from the Delaware River into the Raritan River is being attempted in hopes of re-establishing the run in this river.

**Recommendations:** Fish ladders and restocking programs are necessary where stream blockages exist. Water quality must be improved along the entire length of the river, including the heavily industrialized downstream portions such as those on the Delaware, Passaic, Raritan, and Hackensack. Spawning areas must be protected from degradation. The Raritan River shad restoration project should be closely evaluated and if successful, expanded to other suitable rivers.

American shad are present during the April-June "run" with limited reproduction in the upper portion of the Delaware River.



## BROOK TROUT

*Salvelinus fontinalis*

**Distinguishing Characteristics:** The naturally occurring brook trout is marked by dark green vermiculations on the back and on the dorsal fin, while orange to red spots surrounded by blue borders appear on the sides. The pelvic fins generally are orange to red with the anterior portion lined in white and black. Color is subject to wide variations, particularly between wild and hatchery stock and during the spawning period. The wild fish may have lower sides of bright red and orange with a white belly, while the hatchery fish may be an overall dull blue. This species always has a square caudal fin.

**Distribution and Habitat:** The brook trout is native only to North America, but has been stocked worldwide. In New Jersey, naturally reproducing populations are generally confined to the northwest portion of the state, however, isolated populations have been verified in areas of the Pine Barrens.



Brook Trout

R. McDowell

This species is generally associated with mountain streams; however, its main requirements involve water quality rather than topography. Basic needs include gravel, silt-free bottoms, year-round water temperatures not exceeding 70° F (21° C), dissolved oxygen levels always in excess of 4.0 ppm, sufficient cover, and food supply.

**Status:** Threatened (State). The State's naturally reproducing stocks are jeopardized primarily by land development. Development in the vicinity of streams has often entailed stream channelization, cutting down of overhead cover, the generation of silt, and pollution — factors which act to reduce water quality and stream

habitat to a point at which the year-round survival of brook trout is no longer possible.

**Management Techniques and Protective Measures:** Properly managed, a native trout population can support angling forever. The critical problem facing the state's native brook trout stocks is loss of habitat. The State's surface water quality standards have been set to protect the trout production streams of the State; however, one mishap can wipe out the population in a day. The present stream encroachment laws are geared to protect property from flood damage and not necessarily to protect a stream's ability to support fish. The only sure protection is acquisition of the watershed. Special angling regulations are needed if a fishery is to be dependent solely on a naturally reproducing population. Size limits, bag limits, "no-kill areas," restricted seasons, gear restrictions, and limited entry are all regulations which may be used to manage the fishery. Which ones are used depends upon the individual situation.

Brook trout are easily reared in fish hatcheries; however, they are not stocked in waters supporting native brook trout populations. It is New Jersey's policy to stock only rainbow trout in these waters, as the hatchery brook trout may spread disease particular to that species and brown trout tend to dominate and suppress other trout species.

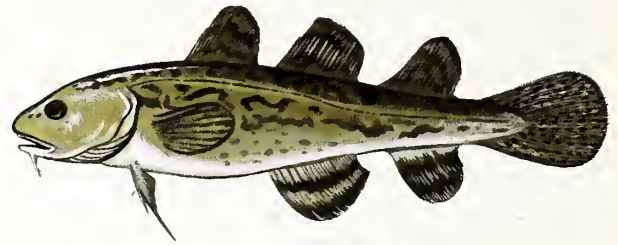
**Recommendations:** Outright purchase of critical habitats or at least control of development rights is necessary to protect our dwindling populations of naturally occurring trout. The implementation of more environmentally oriented restrictions under the stream encroachment regulations must be realized. Specifically, natural trout fishing areas should be created subject to special regulations and vigorous enforcement.

In addition to North Jersey, populations of brook trout have also been confirmed to occur in isolated areas of the Big Timber Creek and the Maurice River drainage systems. Several unconfirmed locations occur in South Jersey. Lines = confirmed; dots = unconfirmed.



## ATLANTIC TOMCOD

*Microgadus tomcod*



Atlantic Tomcod

A. Hillman

**Distinguishing Characteristics:** The Atlantic tomcod resembles the cod very closely. It bears three dorsal fins, two anal fins, a rounded caudal fin, and no spines. The face is distinguished by one large chin barbel. The second ray of the ventral fins are about two times the length of the fin itself.

Populations of Atlantic tomcod have been found in the Hudson River and Sandy Hook Bay area.



**Distribution and Habitat:** The Atlantic tomcod is an inshore fish, which means it frequents mouths of streams and the estuaries into which they empty as well as harbors. Usually found in brackish waters, these fish do run up into fresh-water occasionally.

There are no recent records for New Jersey populations except from Sandy Hook Bay and the Hudson River area. In the early 1950's they were reported from Atlantic City, Longport, and Ventnor.

**Status:** Threatened (State). Reasons for the decline of the Atlantic tomcod are as yet unknown. Much study is necessary to understand both why it is failing and how to improve its status in New Jersey.

**Management Techniques and Protective Measures; Recommendations:** None.



## BLUE-SPOTTED SALAMANDER

*Ambystoma laterale*

**Distinguishing Characteristics:** Averaging 5 inches (13 cm) in length, this salamander has a bluish-black ground color marked with paler blue spots. The spots are most conspicuous laterally but may occur over the entire body. A popular field guide compares the blue-spotted salamander's coloration to that of "the enamelware pots and dishpans of yesteryear." This salamander is easily confused with the Jefferson salamander; however, the area around the vent is black on the blue-spotted salamander, whereas it is gray on the other species.

**Distribution and Habitat:** The major range extends from the Gulf of St. Lawrence across southern Canada and south to northern Illinois and New York. The New Jersey population is disjunct from the main distribution of the species. Its range in New Jersey is restricted to the Passaic River watershed, with population centers in the Great Swamp National Wildlife Refuge, Troy Meadows, and Lincoln Park. Additional populations are found in Hatfield Swamp and Great Piece Meadows. Terrestrial adults require mature woodlands with deep humus and rotted logs, slightly above swamp and marshland level. The breeding habitats—wooded swamps, marshes, and woodland ponds—must be in close proximity to the terrestrial habitat.

**Status; Management Techniques and Protective Measures:** See Tremblay's salamander.



Tremblay's Salamander

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## TREMBLAY'S SALAMANDER

*Ambystoma tremblayi*

**Distinguishing Characteristics:** Morphologically Tremblay's salamander is similar to the blue-spotted salamander. The difference be-



Z. Leszczynski, Herpetological Associates

Blue-spotted Salamander

tween the two lie in the Tremblay's larger maximum body size, slightly lighter coloration, and reduced ventral spotting. The major difference between the two is biological. Reproduction is by a peculiar method known as gynogenesis which involves courtship with male blue-spotted salamander but no chromosome sharing. The offspring consist exclusively of females. The cells of these salamanders are characteristically larger than those of the associated species to accommodate the extra chromosome set.

**Distribution and Habitat:** Tremblay's salamander, because of its unique reproductive habits, must always occur with blue-spotted salamanders. This species was first reported in New Jersey in 1975 and only one definite locality has been found, in Morris County. Further searches are being made. Essentially nothing is known about the life history and ecology of this species.



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Both of these salamander's habitats require a mature woodland bordering a swamp or marsh.

**Status:** Both salamanders are endangered in New Jersey. These species are closely tied to clean waters and the occurrence of these rare species on a site serves to indicate a clean, healthy watershed. Pollution and water-level alterations resulting from the development of watershed areas destroy the fragile ecosystems upon which both the blue-spotted and the Tremblay's salamanders depend.

Man-made barriers such as roads inhibit migration between the required terrestrial and aquatic habitats. The alteration of water levels through ditching or other means is detrimental to breeding sites. Both these activities serve as chief limiting factors for these sensitive creatures.

**Management Techniques and Protective Measures:** A detailed study of the life histories of these two rare salamanders is essential for the formulation of sound management programs. Their precise range must be defined and continually monitored. Additional localities outside their breeding ranges should be sought and identified as potential habitat. Any collecting must be banned. The clearing of woodland swamps or disruption of the water table must be avoided or at least minimized to ensure the Tremblay's and blue-spotted salamanders' survival in New Jersey.

**Recommendations:** None.

A small population of blue-spotted and Tremblay's salamanders occur in the Passaic River drainage system.



## EASTERN TIGER SALAMANDER

*Amboystoma tigrinum tigrinum*

**Distinguishing Characteristics:** Attaining a length of 13 inches (33 cm) in adulthood, the eastern tiger salamander is probably the largest terrestrial salamander in the United States. Along with its large stocky size, its irregular yellow to olive blotches on a dark brown to black ground color make identification easy. The



Eastern Tiger Salamander

Z. Leszczynski, Herpetological Associates

only species with which it might be confused is the spotted salamander (*A. maculatum*), which has two rows of regular bright yellow to orange spots down its back.

**Distribution and Habitat:** Although widely distributed throughout the most of the United States, tiger salamanders reach the northernmost extent of their eastern range along the coastal plain of New Jersey and Long Island. From Georgia northward they occur in distinct populations, each adapted to local conditions with the northernmost population facing the greatest climatic stresses. The former range in New Jersey was a coastal strip from Toms River to Cape May. Human activities, however, have reduced this range to a few small breeding populations in Cape May and Cumberland counties.

The breeding habitat—temporary ponds in early succession or those formed in gravel pits—is where the eggs are laid and larvae feed. In late spring, the larvae migrate from these ponds to subterranean burrows where they



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Burrows are found in the oak woodlands bordering the breeding ponds.



spend most of their lives. These burrows are found within oak woodlands that border the breeding pools. The salamanders mature at about 2 to 3 years of age and leave the burrows temporarily in late winter to return to their original breeding ponds.

**Status:** Endangered (State). Although the tiger salamander is locally common in the southeastern United States it must be classified as endangered in New Jersey. Drainage of hardwood swamps and ponds, lowering of the water table, and other disruptions of fresh water habitats, including housing developments, have all but obliterated natural breeding habitat. However, by being an adaptive pioneer species and quickly colonizing new ponds, tiger salamanders saved themselves from extinction by invading ponds that had formed in gravel pit excavations throughout southern New Jersey. Nevertheless, pressures of human disturbances, including periodic digging in gravel pits and destruction of oak woodlands, have eliminated the species from all but a few of the less disturbed regions.

**Management Techniques and Protective Measures:** Current research calls for a re-evaluation of this species' population status in New Jersey. The study should include monitoring ponds for hatching of larve, and evaluation of the success of a larval transplant program, and studies to determine the home range of breeding adults. From this information management programs can be established and critical habitat delineated. The entire life history of the tiger salamander should also be studied.

**Recommendations:** None.

Eastern tiger salamander's breeding range.



## EASTERN MUD SALAMANDER

*Pseudotriton montanus montanus*



Eastern Mud Salamander

S. Friess

**Distinguishing Characteristics:** Brown eye color is always a quick first clue to the eastern mud salamander's identity. Round, black spots which are quite separate from one another are also characteristic. The body's ground color is red or dark orange. Older specimens are usually brown. The length ranges from 3½ to 6 inches (9 to 15 cm).

**Distribution and Habitat:** Nationally this salamander ranges only from New Jersey south to the Carolinas and northeast Georgia. This is a rare salamander in New Jersey; only two specimens have been recorded. The species is probably restricted to the southern portion of the state where it utilizes clear, unpolluted springs and seepage areas including old cranberry bogs. This required habitat type is found only in portions of the Pine Barrens.

**Status:** Threatened (State). The eastern mud salamander was never common in the state but ranged north to our area only as a marginal species. Individuals are secretive and difficult to find.

**Management Techniques and Protective Measures:** At present, there are no specific management practices for this species. Protection of this species calls for preservation of the water quality in southern New Jersey, for it needs clean streams in which to breed and live. Care must be taken not to use chemicals or insect sprays which might alter the habitat where these salamanders occur. If the streams and rivers are polluted from various effluents, the critical habitat of the mud salamander will be adversely affected.

**Recommendations:** The critical habitat for this species should be identified and protected. Much data are needed on the species' current distribution within New Jersey.

A small mud salamander population is known to occur in Burlington County.



## LONG-TAILED SALAMANDER

*Eurycea longicauda longicauda*

**Distinguishing Characteristics:** This is a long, slender salamander with a bright yellow ground color and small, vertical black markings along its tail and on the sides of its body. Older specimens tend to get darker orange or light brown. The size ranges from 4 to 6¼ inches (10 to 16 cm) in length. As the name implies, the adult has an extremely long, thin tail that is longer than the rest of the salamander's body.



Long-tailed Salamander

Z. Leszczynski, Herpetological Associates

**Distribution and Habitat:** This salamander ranges from southern New York to northern Alabama to southern Illinois. In New Jersey, long-tailed salamanders occur in the limestone belt of Sussex and Warren Counties. They range southward to the central part of the state and are still found in Union County. These sal-

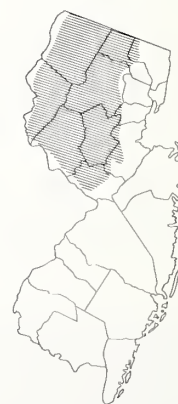
amanders, like most, lay their eggs in clear ponds or slow streams. The eggs hatch into aquatic larvae which bear gills. The terrestrial adult lives under logs in the vicinity of cool streams and feeds on insects and worms.

**Status:** Threatened (State). Like many other native amphibians their clean seepage areas and springs are being threatened by pollution. This quickly kills the larvae in the breeding pools or wells, and it will also affect the adults.

**Management Techniques and Protective Measures:** Current research suggests that to prevent the further demise of this species we must maintain pure water quality. Periodic water samples should be taken from critical amphibian habitats to ensure that water quality standards are met. Again, prevention of habitat loss to the development of roads, homes, and industry is an important measure for a declining species so closely tied to a fragile ecosystem.

**Recommendations:** Much data are needed on this salamander in New Jersey to further develop management policies. Protection of critical habitats from destruction by development and pollution is always a key to stabilizing a dwindling population.

The long-tailed salamander breeds in the northern part of the state.



## PINE BARRENS TREEFROG

*Hyla andersonii*

**Distinguishing Characteristics:** The Pine Barrens treefrog is a stout bodied little frog averaging about 1½ inches (4 cm) with a broad rounded head, long thin legs, and well developed toe-discs. It is easily distinguished by a bright green dorsal color and a lavender side stripe bordered in white. The underside and belly are white and males have purple-gray



Pine Barrens Treefrog

N.J. Endangered & Nongame Species Project



throats. The limbs have a light line between the legs and feet, giving the impression that the frog is wearing gloves.

**Distribution and Habitat:** This species of treefrog is found in proper habitat in Florida and South Carolina as well as New Jersey. In this state, the treefrog has a discontinuous range restricted to the Pine Barrens, which is the northernmost and largest population known. It is found in Atlantic, Burlington, Ocean, Middlesex, Monmouth, and Cape May Counties. The southern white-cedar (*Chamaecyparis thyoides*), a dominant bogland tree species, provides the prime habitat requirements. Pine Barren treefrogs are known to breed in bog lowlands and return to a terrestrial habitat after the breeding season. Currently very little is known about the Pine Barrens treefrog in its nonbreeding habitat.



N.J. Endangered & Nongame Species Project  
The southern white cedar stands of the Pine Barrens provides prime bogland habitat requirements.

The pine barrens treefrog's breeding range is located in the Pine Barrens region of the state.



**Status:** Endangered (State). This status designation reflects the pollution and destruction of the fragile habitat for which this treefrog is named. Many of the previously known breeding locations have given way to man's encroachment. Housing developments, recreational land use, insecticide spraying, and the use of defoliants along roadways and power lines are examples of such habitat destruction. This species can be considered an indicator of a healthy Pine Barrens community.

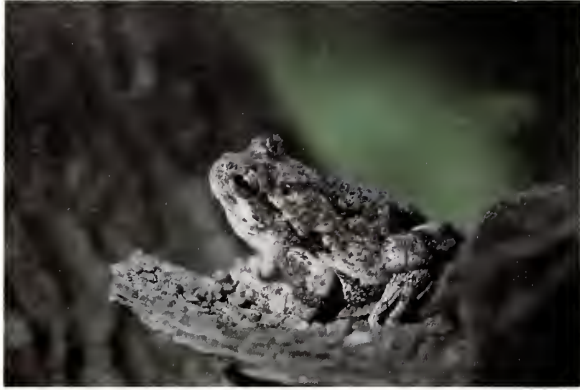
**Management Techniques and Protective Measures:** An annual distributional survey is conducted which locates prime habitat hosting large breeding populations. Observations are made on habitat preference, egg development, metamorphosis, behavior, and breeding season. The data are used when assessing the environmental impact of projects. Sites can be surveyed only during the breeding season in May, June, and July.

**Recommendations:** Large tracts of land must be set aside as a natural preserve if the Pine Barrens treefrog is to be ensured of a future. Although its breeding time is spent in bog lowlands, a terrestrial nonbreeding habitat is required and preservation should not be restricted to lowlands. Proper maintenance of the water level and quality and protection of all known populations is essential. Field investigations should be continued annually.

## SOUTHERN GRAY TREEFROG

*Hyla chrysoscelis*

**Distinguishing Characteristics:** In comparison with other treefrogs, the southern gray treefrog is moderately large, 1½ to 2 inches (4 to 5



Southern Gray Treefrog

N. J. Endangered & Nongame Species Project

cm). As the name implies, it is commonly gray but may vary to greens, browns, or almost white, depending in part on changes in environment or activity. A light spot beneath each eye is usually unmistakable. Under the hind legs the skin is bright orange to golden yellow mottled with black. The southern gray treefrog's back is quite warty, though not as prominent as a toad's. This treefrog is almost identical, in outward appearance, to its northern counterpart, the northern gray treefrog (*Hyla versicolor*). The best way to tell them apart in the field is by voice differences.

**Distribution and Habitat:** The composite range of the two gray treefrogs extends from New England to Florida and west from Texas to Wisconsin. In New Jersey this species is restricted to the Cape May peninsula and south Cumberland County along the Delaware Bay. The breeding habitat of the southern gray treefrog is gravel pit ponds and natural swamps. The nonbreeding habitat is deciduous or mixed woods that extend quite a distance from the breeding area. Except during the breeding season, these frogs are not found on the ground.

**Status:** Endangered (State). Due to the southern gray treefrog's limited distribution in New Jersey, the stress to their habitat and its destruction through development and pollutants, its numbers have been greatly reduced. Mosquito control measures along with urbanization of fragile areas have led to destruction of their habitat.

**Management Techniques and Protective Measures:** An annual distributional survey is conducted during which voice recordings and blood samples are taken for laboratory analysis.

The southern gray treefrog ranges in Cumberland and Cape May Counties.



Blood samples are a second way to distinguish the southern and the northern species.

**Recommendations:** It is recommended that the distribution survey be continued annually and that all known existing populations and critical habitats be fully protected, especially the breeding ponds and gravel pits.



R. Zappalorti

Deciduous woods bordering a pond or swamp provide suitable southern gray treefrog habitat.



## BOG TURTLE

*Clemmys muhlenbergi*

**Distinguishing Characteristics:** The smallest native North American turtle, the bog turtle ranges in size from 3 to 3½ inches (8 to 9 cm). Its slightly keeled carapace varies in color from a light brown to black. The turtle's limbs and fleshy parts are usually brown and may be flecked with red-orange. The most distinguishing characteristic, however, is the large orange or yellow patches on both sides of the head.

**Distribution and Habitat:** The secretive bog turtle occurs in disjunct populations of highly specialized habitat. Open sphagnum bogs, swamps, and marshy meadows having clear, slow-moving streams with soft muddy bottoms serve as optimal habitats. Sedge tussocks, skunk cabbage, cattail, jewelweed, and smartweed are common flora of bog turtle habitats. Throughout its range, from southern Massachusetts to Southwestern North Carolina, this species is considered rare. One of the largest concentrations of the turtle is found in New Jersey, specifically in the coastal plain county of Monmouth, and the noncoastal, Warren, Sussex, Morris, Passaic, and Union Counties.



R. Zappalorti

Marshy meadows serve as optimal bog turtle habitat.

**Status:** Endangered (State). These turtles were probably never numerous; few eggs are laid and juveniles are subject to high mortality. Man's activities have been reclaiming bog turtle habitat for agriculture and urban development and these environmental alterations disrupt the bog turtle's precise semiaquatic requirements. Such alterations include the raising or lowering of the water table within the habitat because of mosquito



Bog turtle

R. Zappalorti

control and agricultural drainage ditches, construction of roadways, and water impoundments.

**Management Techniques and Protective Measures:** The bog turtle is protected in New Jersey by its state endangered status. Field surveys are most productive when conducted at times of low vegetative growth. Studies of the known and suspected habitats suggest that all these areas be protected. Bog turtles disappear in an area when the muddy substrate and associated flora are replaced by hardwood trees such as red maples. The result of this natural succession suggests habitat management by harvesting of some of these trees to keep an open canopy.

**Recommendations:** Projects possibly affecting water levels in bog turtle habitat areas must be carefully considered. Pure unpolluted water is critical for the species' survival in natural bogs and marshes, so wetland ecosystems should be preserved in a healthy state. Because the turtle's habitat is so dependent upon a naturally succeeding environment, normal distribution corridors along effluent streams must be kept open rather than blocked by highways and other construction.

Bog turtle colonies occur in small disjunct populations within the breeding ranges.



## WOOD TURTLE

*Clemmys insculpta*



Wood Turtle Z. Leszczynski, Herpetological Associates

**Distinguishing Characteristics:** The wood turtle is known for its keeled and extraordinary sculptured carapace. The ground color of the carapace is usually some shade of brown, often with yellow streaks radiating from the center. The sculpturing consists of a pyramidal effect of each year's growth on each scute. The undershell is brightly colored with a central blotch of beige or yellow edged with dark brown or black. The limbs of the wood turtle are often a bright reddish or orange color. These turtles range in size from 5 to 8 inches (13 to 20 cm).

**Distribution and Habitat:** The wood turtle is restricted to hardwood forests of a wide range in northeastern North America. In New Jersey it is found spottily throughout the state's northern and central forests. These turtles need clean streams running through or near wet meadows and farmland. These brooks or streams are probably necessary for courtship. They live in large groups or colonies, usually returning to the same stream



Wood turtle breeding range.

each year and often using its muddy substrate or soft banks in the winter for hibernation.

**Status:** Threatened (State). Many of the previously known wood turtle sites have lost primary habitat to development, particularly in the central and northern counties of the State which contain our largest cities. Large populations of the turtles are still found in the lesser developed areas of Morris, Passaic, Sussex, and Warren Counties. Current distributions and population densities of this species are not known.

**Management Techniques and Protective Measures:** Searches of historic wood turtle habitat have been made to determine its status and the relative encroachment of human civilization. Mark and recapture programs over several years have provided valuable information on population migration trends and general age structure. The New Jersey Endangered and Nongame Species Conservation Act prohibits the collection of this threatened species.

**Recommendations:** Because these turtles do show a tendency to return to the same stream each year the water quality of those known and potential streams must be protected. New populations should be sought county by county, and further knowledge of densities should be sought.

## CORN SNAKE

*Elaphe guttata*

**Distinguishing Characteristics:** The corn snake, or "red rat snake," is distinguished by bright dorsal reddish blotches, or "saddles," with black borders, on a ground of gray, tan, or yellow. The first blotch on the neck divides into two branches that extend forward and form a point on the snake's forehead. The belly scales have a distinct checkerboard pattern and some have a bold stripe in the subcaudals almost to the tip of the tail. This snake usually reaches a size of 30 to 48 inches (77 to 123 cm).

**Distribution and Habitat:** The name comes from the snake's preference for cornfields, barns, and corncribs, where it feeds on small rodents. The corn snake is a secretive animal and is difficult to locate. In New Jersey it occurs in Ocean, Burlington, and





Corn Snake

R. Zappalorti

Cumberland Counties, especially in the Pine Barrens, and may range as far north as Monmouth County. Nationally the snake ranges south along the coastal plain to Florida and southern Louisiana with isolated localities in Kentucky. In the Pine Barrens it has been found in hollow logs, railroad ties, or foundations of old buildings. It hibernates and nests in subterranean rodent burrows and stump holes.

**Status:** Threatened (State). Better roads and transportation plus an increase in the popularity of snake hunting have added to the demise of corn snake populations in the Pine Barrens. Again destruction of habitat, including the paving over of old railroad beds, is seriously restricting the species. The snake is very important in wooded and farm environments in controlling rodents that plague farmers and gardeners.

**Management Techniques and Protective Measures:** The corn snake's historic locations should be checked to see if the snake still exists in these sites. Mark and recapture techniques of the known populations will help to better

Breeding range of the corn snake.



evaluate their current status. The snake will benefit from wildlife management techniques such as clearing and maintenance of agricultural fields, which will provide cover crops that encourage small mammals and create brushpiles and logpiles offering suitable hiding places.

**Recommendations:** None.

## NORTHERN PINE SNAKE

*Pituophis melanoleucus melanoleucus*

**Distinguishing Characteristics:** The northern pine snake, second largest nonvenomous snake in New Jersey (48 to 66 inches or 123 to 169 cm), is typically white or cream-colored with a series of black blotches extending from head to tail. Often, along the posterior, the blotches vary with shades of mahogany. A plain white or cream belly is characteristic of the northern



Northern Pine Snake

Z. Leszczynski, Herpetological Associates

pine snake but may be occasionally marked with pink or tan on the subcaudal scales. Its heavily keeled scales are dull on the dorsal surface and glossy on the lateral surface. This snake's pointed head is small in proportion to the rest of the body, enabling it to be an accomplished burrower.

**Distribution and Habitat:** The range of the northern pine snake is from West Virginia and south Kentucky to north and central Alabama and Georgia. In the northeast the snake is found only on New Jersey's coastal plain in the Pine Barrens. It inhabits areas of flat, sandy, piney hills and dry ridges associated with pine woods. Because pine snakes prefer temperatures not exceeding 91° F (33° C), they are active in the warm months during the early morning and later afternoon.

**Status:** Threatened (State). The distribution of the northern pine snake was once wide but recent study has shown that many of the previous habitat areas have been destroyed by development. The northern pine snake, like many southern plants and animals, reaches its northern limits in New Jersey's Pine Barrens. This area is of critical value and should be preserved for the welfare of many of New Jersey's endangered and threatened species.

**Management Techniques and Protective Measures:** Mark and recapture studies are used to monitor populations. Enforcement of laws forbidding the collection of threatened snakes will help maintain populations.

**Recommendations:** Pine snake habitat can be improved by clearcutting small portions of pine-oak woods and building 3 to 4 foot (91 to 122 cm) mounds with stumps, logs, brush, and sand. This would provide good hiding places and will help to attract small mammals, the main diet of the pine snake.

The breeding range of the northern pine snake includes the Pine Barrens region.



## TIMBER RATTLESNAKE

*Crotalus horridus*

**Distinguishing Characteristics:** The timber rattlesnake is one of the two venomous snakes that occur in New Jersey. Adults exhibit a rattle, a series of horny segments at the tip of the tail which provides positive identification. Adults reach an average length of 3 to 4 feet (92 to 123 cm), with some specimens up to 6 feet (183 cm). The basic color pattern is of dark crossbars on a lighter background. Crossbands are sometimes V-shaped and broken into a series of blotches on the upper part of the body. Two color phases are known in New Jersey: a yellow phase with dark bands and a black phase with dark brown-black bands.



Timber Rattlesnake—Yellow Phase

B. Kent

**Distribution and Habitat:** Along the east coast the timber rattlesnake ranges from southern New Hampshire to northern Georgia. Its range extends west to northeastern Texas and southern Wisconsin. It does not occur in a coastal plain habitat south of the New Jersey Pine Barrens. New Jersey's timber rattlesnakes are restricted to wooded areas in the northern mountains and scattered locations in the Pine Barrens. These are two distinct populations separated both geographically and by extremely varied habitat. In the north they occur on rocky ledges and mountain slopes. Their Pine Barren habitat is flat and sandy. Den sites are also required where they can spend the winter months in hibernation. These den sites include burrows in sandy ground, rocky cliffs, crevices, or stump holes.

**Status:** Endangered (State). The timber rattlesnake tends to avoid areas utilized by people,



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Timber rattlesnakes can be found in this rocky area located in the northern mountains. Den sites include rocky cliffs and crevices.



even with minimal habitat disturbance. Lost habitats include areas in which the rattlesnakes hunt for food and a suitable den site for hibernating. Another factor adding to the timber rattlesnake's decline in New Jersey has been its persecution by humans. "Timbers" are particularly vulnerable because they aggregate at den sites where they can be destroyed or collected in large numbers. During early spring and late autumn, these snakes are often sluggish and are easily approached and killed. The timber rattlesnake can be dangerous if molested but serves an important function in the ecosystem as a rodent predator.



Timber Rattlesnake—Dark Phase

Z. Leszczynski, Herpetological Associates

**Management Techniques and Protective Measures:** Protection of den sites and surrounding woodlands from destruction is imperative. The killing and collecting of rattlesnakes has to be prevented. Intensive education programs that

Timber rattlesnake breeding range.



will place rattlers in their proper ecological perspective should be initiated to make the public aware that rattlers do not pose a serious threat. A population dynamics study by the mark and recapture method should be implemented to determine the population size and structure of timber rattlesnakes in New Jersey. Included in the study should be field checks of historic denning sites.

**Recommendations:** Strict laws forbidding the collecting or killing of rattlers should be established and enforced. Portions of the following existing State and private lands should be protected as sanctuaries: Stokes State Forest, Worthington State Forest, and Pequannock Watershed, and those Federal and State lands of the Pine Barrens.

## PIED-BILLED GREBE

*Podilymbus podiceps*



Pied-billed Grebe

O. S. Pettingill, Cornell Lab of Ornithology

**Distinguishing Characteristics:** The pied-billed grebe is distinguished from other grebes by its brown coloration, thick, round bill, white undertail feathers, and lack of white wing patches. Breeding adults exhibit a black ring on the bill and a black throat patch. The webbed feet are located far back on the body, making the pied-billed an excellent swimmer.

**Distribution and Habitat:** Formerly the pied-billed grebe was widely distributed in fresh water ponds, creeks, and marshy areas throughout the East. Nesting grebes prefer freshwater marshes that are not densely vegetated. Typical breeding locales in New Jersey were Brigantine National Wildlife Refuge, Lighthouse Pond in Cape May, and various localities in the Hackensack Meadowlands. The pied-billed grebe winters in fresh and salt water habitats.

**Status:** Threatened (State). Suffering from habitat loss until the creation of wildlife refuges in the 1950's, this grebe is still declining as a breed-

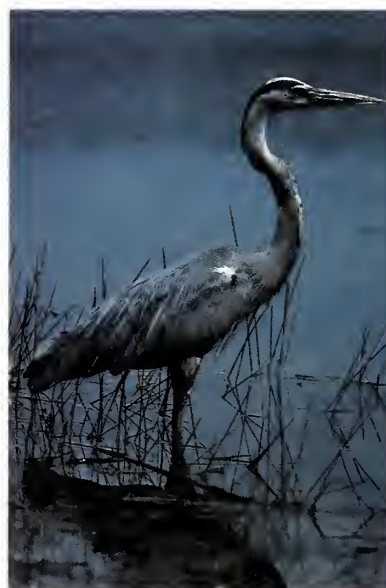
The breeding range of the pied-billed grebe occurs along the Bergen and Hudson County line.



ing bird in New Jersey. It is common as a migrant and regular in small numbers in the winter. Apparently the grebe no longer nests at Brigantine National Wildlife Refuge, and at present there is only one known nesting population in the Hackensack Meadows, in Kearny Marsh. A few pairs are occasionally reported at miscellaneous locations statewide.

**Management Techniques and Protective Measures:** There are no management techniques currently practiced specifically for this species. Research suggests that habitat protection is critical for the survival of New Jersey breeding populations of pied-billed grebes. Protection of Kearny Marsh and other potential sites is in order. Flooding of marshes to thin their vegetation, especially common reed (*Phragmites australis*), may create the slough-type area these grebes need. Damming of streams to flood overgrown marshes in the Meadowlands could be considered.

**Recommendations:** A breeding census of favorable nesting areas should be undertaken. Areas supporting only one pair could be made attractive by enlargement.



Z. Leszczynski, Herpetological Associates

Great Blue Heron

## GREAT BLUE HERON

*Ardea herodias*

**Distinguishing Characteristics:** The largest resident heron of New Jersey is easily distinguished in adulthood by its height (4 feet or 1.2 m) and blue gray coloration. The head is largely white as is the throat. Adults are distin-



guished from juveniles by the dark "shoulder" patch at the crest of the wing. The dark underparts distinguish the great blue from the Louisiana heron.

**Distribution and Habitat:** This species ranges throughout the continental United States and southern Canada. Great blue herons are present in the state year-round on lakes and wetlands. Although regularly seen in proper habitat in late July to mid-September, they occur in small numbers on the winter salt marshes, occasionally in the autumn near large bodies of open water, and have been reported during winter in agricultural fields presumably stalking small rodents. Previously, great blue herons have been reported nesting in Pine Barrens swamps, bayshore, pin oak swamps, red maple swamps, and barrier island woodlands in coastal locations. Twenty-six historic breeding colonies were reported by Miller in 1943, none of which are known to be currently active. At present, only 5 sites statewide are known to be active rookeries.

Great blue heron breeding range. An unconfirmed nest site (light shading) occurs in Morris County.

**Status:** Threatened (State). Of the 5 known, currently active colonies, only the Pomona and Sandy Hook colonies are located in traditional coastal habitat. The remaining colonies at Great Piece Meadows, Lafayette, and Montague occur inland in freshwater swamps. One additional interior colony is suspected to occur in the Great Swamp.

The statewide breeding population of great blue herons is considered threatened with only 291 pairs reported at 4 rookeries in 1978.

**Management Techniques and Protective Measures:** Consideration should be given to bringing all great blue heron rookeries into public ownership. Recently the Lafayette rookery was

acquired by the local township through Soil Conservation Service funding assistance. Human activity at or near colony sites should be strictly prohibited as this species is sensitive to disturbance and will desert previously active heronries if disturbed. Active lumbering in the vicinity during the breeding season and removal of nest trees through timber harvest should also be prevented at known colony sites.

**Recommendations:** Efforts to locate and census additional sites are needed. Winter censuses should be compiled and areas of important wintering habitat delineated. Historically active heronries should be checked for recent nesting activity.

## COOPER'S HAWK

*Accipter cooperii*

**Distinguishing Characteristics:** The Cooper's hawk is a crow-sized raptor of the woodlands. Unlike the high-soaring buteos which have broad wings and a fan-like tail, the low-flying Cooper's hawk has short, rounded wings and a long, rounded rudder-like tail for maneuverability. The dark, blue-gray back is responsible for its nickname, the "blue darter." Often confused with the smaller sharp-shinned hawk, the Cooper's hawk shows a sloping profile and a more prominent head as compared to the smaller, more common "sharpie."

**Distribution and Habitat:** The Cooper's hawk nests sparingly over most of the United States, southern Canada, and northern Mexico. At



N. J. Raptor Association

Cooper's Hawk



Soil Conservation Service  
Cooper's hawk habitat requires open woodland  
and wood margins

present, few Cooper's hawks nest in this state but they can be sighted during the spring and fall migrations at lookouts statewide from the Kittatinny Mountains to Cape May. A small number annually winters in New Jersey. Occupying open woodlands and wood margins, they usually nest 20 to 60 feet (6 to 18 m) above the ground and are considered very secretive birds.

**Status:** Endangered (State). In New Jersey the Cooper's hawk has never been a common bird. The general consensus among raptor experts is that their numbers have recently been increasing from a previously low population level. Like most endangered species the major factor affecting their population is the destruction of their nesting habitat.

**Management Techniques and Protective Measures:** This bird is protected by both the Federal Migratory Bird Treaty Act and the State Endangered Species Act. Banding data from the fall and spring migration of Cooper's hawks are compiled from two stations at Cape May and the Kittatinny Mountains. Also, the number of Cooper's hawks seen at the 8 other New Jersey hawkwatch stations is reported along with any additional statewide incidental sightings.

**Recommendations:** Banding operations should be continued and expanded to include a field survey for nests in Sussex, Warren, and Hunterdon Counties. Particularly, a search should be conducted of the areas previously used as nesting sites.

A comparative review of the data from inland stations in New Jersey and Pennsylvania is needed to accurately interpret long-term trends in migrating populations.

Public education regarding the ecological value of hawks is essential along with the preservation of any known nesting habitat.

Lines—Cooper's hawk  
breeding range  
Crosshatch—Cooper's hawk  
wintering range.  
Dots—Unconfirmed  
wintering locations.



## RED SHOULDERED HAWK

*Buteo lineatus*

**Distinguishing Characteristics:** This richly colored hawk has, at maturity, a pale reddish color on the under parts and brown plumage on the back. The rust "red shoulders" are hard to distinguish in the field. The dark tail feathers have several narrow white bands. A translucent patch near the tip of the wing is characteristic of several species of hawk. Therefore the best identifying features are general shape and uniform color. This hawk attains a length of 17 to 24 inches (44 to 61 cm).



Red-shouldered Hawk

W. S. Clark

**Distribution and Habitat:** The red-shouldered hawk was formerly considered one of the most common hawks of eastern North America. In New Jersey, it breeds in moist woodlands both in the northern section and on the coastal plain. These hawks generally nest under the forest canopy, placing the nest in the first main crotch of a hardwood. Limited nesting may possibly



Red-shouldered hawk  
breeding range.



occur in the Pine Barrens. Migrations occur primarily along inland mountain ridges. Small mammals, amphibians, reptiles, and some small birds are usually taken by hunting from a favorite perch. A few hawks winter within the State.

**Status:** Threatened (State). Habitat destruction has probably had the most severe impact on this species. Fortunately for these birds, their diet is not solely based on insect-eating animals; consequently, DDT and other pesticides have only caused marginal problems in this bird's reproductive success.

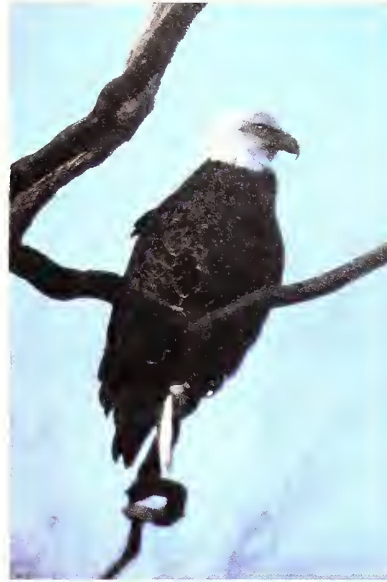
**Management Techniques and Protective Measures:** Baseline data on population size and prime nesting habitat must be obtained within the state. Further studies will provide additional understanding on the status of this raptor. Nesting habitats should be protected and buffer zones created to minimize human disturbance. Of course enforcement of Federal and State migratory bird laws is in order to keep the red-shouldered hawk from further decline.

**Recommendations:** None.

## BALD EAGLE

*Haliaeetus leucocephalus*

**Distinguishing Characteristics:** The snow-white head and tail of the adult, contrasting with its dark brown body plumage, make this an impressive eagle. Also characteristic of this bird are its yellow legs, bill, and eye. Both sexes are colored alike, although the female is larger than the male. The plumage of the first year juvenile is a uniform blackish color, becoming lighter as years pass. The young eagle annually acquires more white on the tail and head until full adult plumage is achieved in about 5 to 6 years. A young bald eagle is often confused with the



N. J. Raptor Association

Bald Eagle

golden eagle though the golden eagle has much more distinct white wing patches and a broad white tail band, in contrast to the irregular mottling of the immature bald eagle. Reaching a length of about 3 feet (92 cm) and a wingspan of about 7 feet (2.2 m), the bald eagle weighs between 8 and 14 pounds (4 to 6 kg).

**Distribution and Habitat:** The bald eagle is restricted to North America and is usually found within close proximity of open water. Generally a resident species, the bald eagle retires southward in the winter from the extreme northern part of its range. There is a small wintering population throughout New Jersey which concentrates in the Dingman's Ferry area of the Delaware River, Brigantine National Wildlife Refuge area, and the Dividing Creek area of Cumberland County along the lower Delaware River.



N. J. Endangered & Nongame Species Project  
Bald eagle habitat is found within close proximity to open water.



The bald eagle nests only in Cumberland County (crosshatching). Bald eagle wintering range (lines).



**Status:** Endangered (Federal and State). The number of active nest sites in New Jersey has dropped dramatically since 1950 owing to the use of persistent pesticides, especially DDT. In New Jersey, this chemical was used extensively in the late 1940's and early 1950's for agricultural pest and statewide mosquito control. DDT quickly found its way into the food chain, through which it accumulated in the bodies of the eagles. Research has shown greatly reduced reproductive success in these birds due to resultant infertile and thin-shelled eggs. The only known active and productive nest site in New Jersey is located in Cumberland County.

**Management Techniques and Protective Measures:** Information on eagle nesting success in New Jersey is gathered during aerial surveys of the nest site. Data on wintering eagles and their habitat are also obtained from the winter waterfowl survey conducted by the Wetlands Section of the Bureau of Wildlife Management; a wintering bird survey sent to compilers of the annual 13 State Christmas Bird Counts, the National Wildlife Federation's wintering bald eagle survey, and incidental sightings reported to project personnel.

**Recommendations:** There is a need for an increase in public awareness of the plight of American eagles and their need for protection. Prohibition of habitat alteration on public lands is important, as eagle nesting sites will be a valuable move in the protection of this bird. Privately owned nesting sites should be protected either through acquisition or an understanding with landowners.



Northern Harrier

W. S. Clark

## NORTHERN HARRIER

*Circus cyaneus*

**Distinguishing Characteristics:** The northern harrier, or marsh hawk, is a medium-sized, owl-faced raptor. It characteristically shows a slim profile with long pointed wings and a long, rounded tail. It rocks in flight, holding its wings in a pronounced "V" shape, a characteristic shared only with the turkey vulture. Plumage on the adult male's upper surface is a striking blue-gray, while the undersurface is white with varying degrees of spotting along the breast and sides. Females are brown-backed with a pale brown to tawny underside, streaked with brown. The northern harrier is the only North American hawk with a white rump.

**Distribution and Habitat:** Northern harriers breed throughout most of the North American continent. They winter south to Central America, vacating the northern portions of their range in winter.

The harrier is a bird of open areas (prairies, fields, fresh and tide water marshes), a habitat preference manifested on both the breeding and the wintering areas. In migration, harriers may be observed along interior ridges (e.g., Kittatinny Ridge), although they occur in greater numbers along the coast (e.g., Cape May and Sandy Hook areas). Spring migration extends from mid-March to mid-May, autumn migration from late July through November.

In New Jersey, breeding by this species is now restricted mostly to the largely undisturbed expanses of wetlands in Salem, Cape May, and Cumberland Counties.

**Status:** Threatened (State). Northern harriers are common wintering raptors in this state, par-

ticularly along the Atlantic and Delaware Bay marshes. The breeding status of the bird is not well documented. Historically healthy, the population declined at an uncharted rate presumably in response to uncontrolled use of pesticides as well as to other factors. Being a ground-nesting raptor presents special problems to the harrier. Incubating birds will abandon the nest after a flush; birds with young will remain in the vicinity but will not actively defend the young. Findings suggest that the bird has been largely extirpated as an inland breeder and that coastal populations have declined as well.

**Management Techniques and Protective Measures:** The State raptor protection bill, the Federal Migratory Bird Treaty Act, and the State threatened status protect the harrier. Assessments made on the difference in numbers of hawks found in bayshore and coastal marshes suggest that these birds are very sensitive to human disturbance. The practice of straight ditching used for mosquito control may also bear some responsibility for the population decline.

**Recommendations:** The best means of ensuring the survival of the northern harrier as a breeding and wintering species in New Jersey is to secure and preserve large expanses of coastal wetlands. Until the effects of various forms of human disturbance may be examined, these wetland areas should be preserved in their natural state.

Northern harrier breeding range



## OSPREY

*Pandion haliaetus*

**Distinguishing Characteristics:** The osprey is a large raptor easily identified in flight by dark underwing patches and an obvious crook in its long wings. The plumage is dark above and white below with a dark "necklace" evident on the breast of the female. Other than this the



Wm. Robichaud

Osprey

sexes are similarly colored, the female being larger. Broad dark streaks appear on either side of the head, running through the eye. The tail is light-colored and shows fine dark bands and a broad terminal bar edged in white. The osprey's talons are especially adapted for catching fish.

**Distribution and Habitat:** The osprey's North American breeding range extends from northwest Alaska and Canada to California and east along the Gulf coast to Florida and up the Atlantic seaboard. Inland populations occur near bodies of water well stocked with fish, the osprey's primary food. In New Jersey, the osprey nests in Monmouth, Ocean, Atlantic, Cape May, Cumberland, and Salem Counties. Nests consisting of sticks, eelgrass, and debris are constructed on transmission towers, light poles, channel markers, and other manmade struc-



Wm. Robichaud

Ospreys select nest sites near bodies of water with high fish populations.



tures as well as dead or dying trees. These structures afford the bird a good view of its territory. Ospreys select nest sites near water for security and a good food supply.

**Status:** Endangered (State). The osprey's decline in New Jersey can be attributed to two factors: the loss of nesting sites such as dead trees, and chemical contamination of their habitat. Pesticides and other chemicals that reach the waters and contaminate fish populations build up to a critical level in the body when the osprey feeds on these fish. This chemical poisoning may severely restrict breeding by causing infertility or critical eggshell thinning.

**Management Techniques and Protective Measures:** Two annual aerial censuses are flown, the first in April to determine returned ospreys on the nest, and the second in June to determine breeding pairs. Regular censuses of nests are made by foot or boat, and fledglings are banded statewide to provide information on reproductive success. Osprey poles with a top platform are constructed to replace the disappearing dead trees favored by these birds. Fortunately a curtailment of pesticide use and other chemical pollution has resulted in increased fertility in the few remaining nesting ospreys. In 1974, a successful egg transfer was conducted and yielded five fledglings. The next year, 40 eggs were brought from Maryland and 18 birds were fledged as a result.

**Recommendations:** Protection of the osprey calls for continued survey and protection of osprey habitats as well as strong control of chemical pollution. Construction of osprey nesting poles is also needed to replace disappearing natural nesting sites.

Osprey breeding range.



## PEREGRINE FALCON

*Falco peregrinus*



Peregrine Falcon

N. J. Endangered & Nongame Species Project

**Distinguishing Characteristics:** An adult peregrine reaches a length of 13 to 19 inches (33 to 49 cm), the female attaining the larger sizes. The blue-gray back is contrasted with a white to tawny-orange color on the throat and underparts. This falcon's facial pattern distinguishes it from other hawks in that the black plumage of the head extends down both sides, forming heavy bars resembling side burns. The underparts are either extensively spotted or barred with black. The long pointed wings and long tail of this magnificent bird enable it to maneuver easily while attacking birds in the air. Peregrines, formerly called "duck hawks," are considered the fastest birds in the world, diving at speeds of up to 180 mph (290 Km/h).

**Distribution and Habitat:** Formerly breeding from Alaska through the Baja peninsula, and from northern Canada south to Louisiana, the peregrine wintered primarily in the southern parts of its breeding range. The peregrine is



Wm. Robichaud

A peregrine tower, constructed in suitable habitat, provides nest sites.



not known to have reproduced in New Jersey or in any state east of the Mississippi River since the early 1950's. A cliff nester, the peregrine was last known to nest in New Jersey on the Palisades along the Hudson River. Currently it occurs during migration along the barrier islands and coastal wetlands of New Jersey.

**Status:** Endangered (Federal and State). North American populations of the peregrine declined significantly during the 1950's and 1960's. The U.S. Fish and Wildlife Service estimates that in 1970 there were fewer than 55 known active nests in the continent including western Mexico and southern Canada. Contributing to the decline of peregrine populations are the usual factors of loss of critical nesting habitat and human disturbance of nesting sites. By far the most serious enemy of this falcon has been the use of pesticides such as DDT, which causes thinning of egg shells and their subsequent breaking under the weight of incubating birds.



Peregrine falcon nest sites. Additional nest sites will be added as the reintroduction program is expanded.

**Management Techniques and Protective Measures:** The Peregrine Fund, a nonprofit organization, launched a program to re-establish the peregrine falcon in the United States through the reintroduction of young falcons into the wild. In 1968, four young falcons were taken from Alaska by researchers and raised in breeding enclosures at Cornell University. As a result, 80 broods were produced by these birds from 1973 to 1975. In 1975, 16 young peregrines were released experimentally from hacking (or rearing) towers in Maryland, Massachusetts, New York, and New Jersey. The reintroduction program was continued and expanded the following years and there are signs that the peregrine falcon may again breed successfully in the wild in New Jersey.

**Recommendations:** Further controls must be enacted to minimize environmental pollution by contaminants such as pesticides. Cooperative efforts of reintroduction programs with the Peregrine Fund must be continued.

Any active nest sites which develop must be protected either through acquisition, easement, or agreements with landowners. Conservation education should be directed to better acquaint the public with the plight of the peregrine.

## UPLAND SANDPIPER (PLOVER)

*Bartramia longicauda*

**Distinguishing Characteristics:** This long-legged sandpiper reaches about 10 inches (26 cm) in length. Compared to other sandpipers it has longer legs, neck, and tail but a smaller head and shorter bill. The upper parts of this bird are blackish-brown with each feather edged in tawny-brown. The underparts are grayish-white, making the whole bird look like a tuft of dried grass.

**Distribution and Habitat:** The upland sandpiper ranges from Alaska to Mexico. Along the east coast, the upland sandpiper breeds mainly from central Maine to northern Virginia. It is a local and rare resident in grassland areas of New Jersey, where it may breed in upland pastures and old fields. The bird is also found around airports and in migration on the sod farms of south-central Jersey.

**Status:** Threatened (State). The population of this species is declining but its exact status cannot be determined with our present knowledge. As a ground nester in open fields, its decline can to some extent be attributed to destruction of its nests in pastures and hayfields by mowing



Upland Sandpiper

M. Hopiak, Cornell Lab. of Ornithology

The breeding range of the upland sandpiper.



machines. Loss of farmland to real estate development has also contributed to the loss of habitat of this species.

**Management Techniques and Protective Measures:** The problem with the survival of this bird is in its habitat needs: on one hand it needs protection of open meadows and grasslands, and on the other it also needs protection from early season mowing that maintains those areas. Protection must include the setting aside of suitable nesting areas and a thorough knowledge of population and migration patterns.

**Recommendations:** Since the young are fledged and ready to start migration in July, delaying mowing until that time would significantly ease the strain on these populations. One alternative is to leave unmowed patches where birds are nesting. Education of and understanding with landowners would prove helpful to both man and bird, as upland sandpipers feed exclusively on grass field pests.

## ROSEATE TERN

*Sterna dougallii*

**Distinguishing Characteristics:** A white-backed, black-capped bird, the roseate tern is similar in size to the common tern from which it is distinguished by its large, white, more deeply forked tail, pale wingtips, and black bill. Its mantle is pale gray. The white tail extends far beyond the wings when the bird is at rest. In flight, the wings appear pale white and the wingbeat is deep.

**Distribution and Habitat:** This bird breeds locally in widely separated colonies along the coast from Nova Scotia to Texas, most commonly along eastern Long Island and southern New England. The roseate tern has been a rare



Roseate Tern

H. Lapham, Cornell Lab. of Ornithology

nester in common tern colonies in coastal areas of south Jersey and Sandy Hook. Apparently, locations in dense grass are preferred to open sand. In recent years, very few adults have been seen during the breeding season (June) at Sandy Hook, Holgate and Sedge Island in Barnegat Bay. Nothing is known of the breeding success of the roseate tern.

**Status:** Threatened (State). Always a rare breeder in New Jersey, the roseate tern is scarce as a migrant and probably quite pelagic. In recent years, only about one breeding pair per year has been discovered in the state, despite intensive monitoring of tern colonies all along the coast. Due to the roseate tern's restricted range in the New World, it will probably remain a rare species in New Jersey.

The roseate tern nests along the east coast. Unconfirmed nesting locations (dots) occur along the southern part of the coast.





**Management Techniques and Protective Measures:** The monitoring and fencing of any common tern colonies in the annual Colonial Waterbird Survey will also protect any roseate terns nesting in association with other waterbird species.

**Recommendations:** Monitoring and censusing of tern colonies should continue annually.

## LEAST TERN

*Sterna albifrons*



Least Tern

J. Galli

**Distinguishing Characteristics:** The least tern is the smallest of the North American terns. Predominantly a white bird with a gray back, it can be easily identified by its black cap with a white forehead patch, a black-tipped yellow bill, and yellow legs which distinguish it from young common terns. The immature bird has a contrasting wing pattern and a duller bill. However, the white forehead mark and a black eyestripe are apparent even in the immature plumage.

**Distribution and Habitat:** This species breeds from Texas to Massachusetts along the coast, also occurring in the Mississippi and Missouri River systems of the central United States. These birds are seasonal residents of New Jersey's shore beaches and sandy areas, where they arrive in mid-May from Central and South America. The nests, or "scrapes," are merely hollowed-out depressions on the bare sand of the open beaches. The least tern prefers to nest where the beach is clear of vegetation although sparse, grassy areas are needed nearby for the chick's protection. New Jersey's least tern colonies occur in Cumberland, Cape May, Ocean, Monmouth, and Atlantic counties.

**Status:** Endangered (State). There appears to be a downward trend in New Jersey's least tern



N. J. Endangered & Nongame Species Project  
The least tern nests on sand of open beaches.

population. These terns require bare sand for nesting and in many areas, beach erosion and residential development have reduced the amount of natural sand above the high tide mark. Also, bare sand is only a temporary situation because of natural growth of vegetation. Human interference is the most serious threat to the least tern population. Tourism, development, and recreational uses of New Jersey's beaches and wetlands have forced the least tern out of many beach nesting areas. Data have revealed that nearly 10% of this species' traditional nesting sites are disappearing each year.

**Management Techniques and Protective Measures:** Endangered and Nongame Species Project personnel are responsible for the "Survey of Colonial Nesting Waterbirds of Coastal New Jersey," which determines the population of least terns and factors limiting reproduction. The project is a weekly program of colony survey, monitoring, posting, and patrolling the colonies, all of which have been effective in reducing human disturbance of colony sites. The program begins in June and continues through the summer.

The least tern nests along the east coast.





**Recommendations:** The Colonial Waterbird Survey should be continued annually. Suitable habitat is critical and every effort should be made to protect and maintain all colony sites. Efforts should be initiated to bring privately owned barrier beach sites such as South Cape May Meadows under State ownership. Habitat protection for this species will be assured by continued and expanded posting and patrolling programs. These efforts, coupled with educational programs to encourage local individuals and community organizations to support protection efforts of colonies in their areas, should enhance the least tern's chances for survival as a breeding species in New Jersey.

## BLACK SKIMMER

*Rynchops nigra*



Black Skimmer

N. J. Endangered & Nongame Species Project

**Distinguishing Characteristics:** An inhabitant of New Jersey coastal areas, the black skimmer is identified by its completely black back and forehead which contrast dramatically with its white throat, neck, and belly. The underwing area is also white with black-tipped wing margins. The long, red bill, characteristic of the species, is tipped with black. It is the only bird which has a lower mandible longer than the upper. The black skimmer will drag the lower mandible through the water as it skims low over tidal ponds and creeks in search of food.

**Distribution and Habitat:** This species occurs along the coast from Texas to Massachusetts. The black skimmer flocks in New Jersey's coastal bay areas from Cape May Point north to Barnegat Light. Nesting colonies are found especially in Cape May, Atlantic, and Ocean Counties. The colonies of black skimmers found at Strathmere Bay, Holgate, and Avalon Cause-



N. J. Endangered & Nongame Species Project  
Sandy beaches or edges of marsh islands in the bays are preferred habitats of the black skimmer.

way are the largest and traditionally the most successful nesting sites in New Jersey. Sandy beaches or spoil areas are the preferred nesting habitat. Human activity on the beaches and consequent scarcity of undisturbed sand areas have forced the skimmers in Barnegat Bay to shift their nest sites to the wrack-strewn edges of marsh islands in the bay.

**Status:** Endangered (State). Traditionally barrier beach nesters, black skimmers are under severe pressure from human recreational activity and development, and from predation by rats. Suitable unoccupied sites are limited, particularly those on beaches. This human disturbance seriously disrupts the reproductive success of the skimmer along with that of many other colonial waterbird species. The number of nesting colonies is sufficiently low to warrant the skimmer's inclusion on New Jersey's endangered species list.

**Management Techniques and Protective Measures:** The New Jersey Division of Fish, Game and Wildlife's Endangered and Nongame Species Project personnel survey nesting locations

The black skimmer nests along the east coast.



and possible sites during the Colonial Waterbird Survey each spring. Estimations of colony size and numbers of active nests and young are made to determine population trends. Locating and protecting critical nesting habitat and monitoring reproductive success involve both air and land patrols. The nesting sites are posted and monitored by cooperators throughout the state.

**Recommendations:** The Colonial Waterbird Survey should be continued annually along with follow-up ground monitoring by foot. The active colony sites must have full protection because of the vulnerability of colonial ground nesters. Where feasible, posting of colonies should be coordinated with educational programs to encourage a local effort in the protection of these birds. Natural vegetative encroachment must occasionally be set back at colony sites to maintain the important open sandy areas.

## BARRED OWL

*Strix varia*

**Distinguishing Characteristics:** The barred owl is a large, tuftless owl with dark brown eyes and a moon face. The only other dark-eyed owl in New Jersey is the light-colored barn owl. The light upper breast is horizontally barred with brown feathering, in contrast to vertical brown streaking on the belly. In flight, the barred owl resembles the great horned owl.

**Distribution and Habitat:** Resident from Newfoundland and southern Quebec to Florida and

Barred owl breeding range.



Texas, the barred owl is an inhabitant of the swamps and bottomlands throughout the state, the deciduous woodlands of Stokes State Forest, and of the Pequannock Watershed. It also occurs in the Great Swamp, Great Piece Meadow, Hatfield Swamp, Princeton Institute Woods, Manahawkin Swamp, and Cape May County swamps. The barred owl usually nests in a hollow tree or in an old squirrel or crow nest.

**Status:** Threatened (State). Although the barred owl is a permanent resident in New Jersey, its status is considered threatened. Barred owl numbers in New Jersey have decreased owing to severe habitat losses, such as draining of wetlands, and destruction of woodlands.

**Management Techniques and Protective Measures:** All birds of prey are fully protected under both Federal and State Law.

**Recommendations:** Full protection of the wooded, swamp, and bottomland areas of the state known to be inhabited by the barred owl is needed to improve this species' status. Specifically, these are the Pequannock Watershed, Great Swamp, Great Piece Meadow, Hatfield Swamp, Princeton Institute Woods, Manahawkin Swamp, and Cape May swamps.

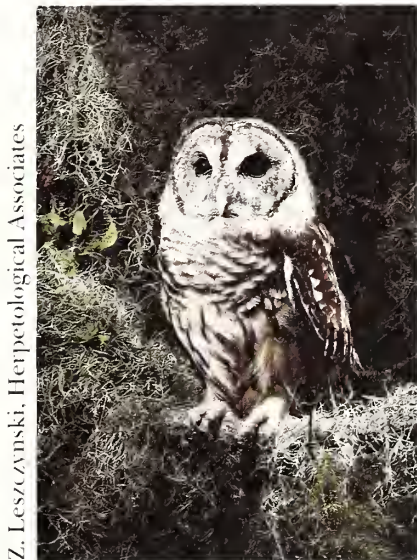
The lesser known areas of barred owl habitat should be censused annually, particularly in Warren, Hunterdon, Gloucester, and Burlington Counties.

## SHORT-EARED OWL

*Asio flammeus*

**Distinguishing Characteristics:** The short-eared owl is a crepuscular and nocturnal, crow-sized owl of open country and marshes. It can be identified by its buffy brown color, the black patch near the bend of the underwing, and the

Barred Owl



Z. Leszczynski, Herpetological Associates



large buffy area on the upper wing surface. Its flight is floppy and batlike. Its wings are tilted upward like the harrier's.

**Distribution and Habitat:** The short-eared owl breeds from the Arctic Zone south to New Jersey and west to Kansas, wintering from the northern United States to the Gulf of Mexico. It can be found in the winter and during spring and fall migrations in the coastal marshes and at favored inland field locations where rodents are abundant. It is found in the Hackensack Meadows, Manahawkin Wildlife Management Area, Brigantine National Wildlife Refuge, and Cumberland County marshes. This species is a ground nester.



Z. Leszczynski, Herpetological Associates

Short-eared owl

**Status:** Threatened (State). While still a fairly common transient and winter visitor, the short-eared owl has greatly declined as a breeder in New Jersey partly because of the filling and development of marshes. During the 1970's, no short-eared owl nests were found. Three pairs of owls were reported during the 1979 breeding season and one pair was accompanied by one immature bird; however, no nests were found.

**Management Techniques and Protection Measures:** An annual census is required for this species along with protection of the wetlands and maintenance of wildlife management areas, thus providing the necessary feeding and nesting areas. All birds of prey are fully protected under both Federal and State law.

**Recommendations:** The present northern harrier censusing should include the short-eared owl to determine whether any are still nesting in New Jersey. Nesting sites should be protected from disturbance.

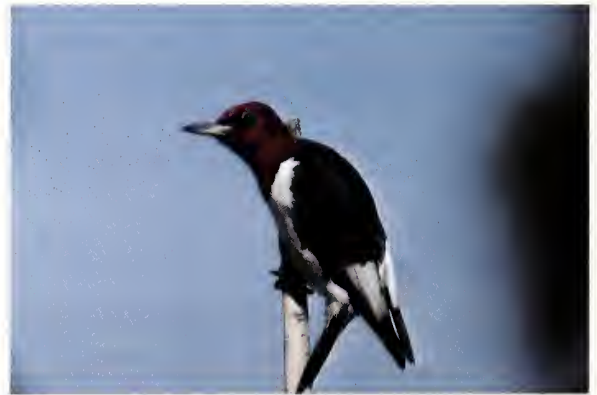
Short-eared owl breeding range.



## RED-HEADED WOODPECKER

*Melanerpes erythrocephalus*

**Distinguishing Characteristics:** This large woodpecker is about the same size, 8½ to 9½ (22 to 24 cm) as a hairy woodpecker. The adult is a spectacular combination of red, white, and black plumage. Its entire head is bright red while the shoulders, back, and wings are jet black. A large white patch on the wings distinguishes this woodpecker and the belly is also white.



Red-headed Woodpecker

Wm. Dyer, Cornell Lab. of Ornithology

**Distribution and Habitat:** The striking red-headed woodpecker is a permanent resident of the central and eastern United States, breeding as far north as the Great Lakes. Its preferred habitat is open groves of large trees, and it is also found in tracts of burned-over forests where live trees are scattered amongst plentiful tree snags. The red-headed woodpecker does not hesitate to live near civilization if large tree snags for nesting sites and plentiful beetles, borers, and grubs are available.



Red-headed woodpecker breeding range. Nest sites may occur in northern Sussex County (lightly shaded area).



**Status:** Threatened (State). The red-headed woodpecker is restricted mostly to the farm country of Sussex and Somerset Counties. Some burned-over areas in the vicinity of Greenwood Forest, Ocean County, harbor a few of this species. A few pairs also occur in the large timber trees in the Lakewood, Cape May, and Middle Delaware River areas. Once very plentiful throughout the State, this species declined greatly between the 1940's and 1970's.

**Management Techniques and Protective Measures:** Efforts to preserve groves of big trees and/or burned-over areas in the pines where tree snags help maintain feeding and nesting habitat for this bird. An annual census of these birds is kept by checking Audubon Christmas Bird Counts on a regular basis. Many municipalities have ordinances requiring tree permits before removing trees to allow for development. Such regulations should consider the need for providing and retaining habitats for this species in seemingly useless dead trees. On State land, red-headed woodpecker habitat can be managed by retaining standing dead trees instead of permitting them all to be cut for firewood. In parks, winter feeding could also aid this species.

**Recommendations:** None.

## CLIFF SWALLOW

*Petrochelidon pyrrhonota*

**Distinguishing Characteristics:** Cliff swallows are the same size as tree swallows with which they often associate during migration. The tail is square-tipped, not the common forked "swallow" tail. The crown of this bird, and back of head, are glossy blue-black with a conspicuous dull white patch between the short bill and

head. The back is also blue-black but streaked with grayish stipes. Varying colors of rusty brown mark the bird's rump (reddish orange), chin (chestnut brown), wings, and tail (rusty gray-brown).

**Distribution and Habitat:** These birds migrate to South America for the winter but breed from Nova Scotia to Virginia. They are colonial nesters that formerly nested, as the name suggests, on cliffs. Now they nest almost exclusively on or under the eaves of barns, mostly in the north-west part of the state. This species is entirely dependent upon insects for food so they concentrate in areas where insects are plentiful.



Cliff Swallow

O. S. Pettingill, Cornell Lab. of Ornithology

**Status:** Threatened (State). Colonies of cliff swallows have been decreasing in numbers for several decades. The bird's dependence on insects has probably resulted in its being affected seriously by toxic insect sprays. Habitat destruction as a result of New Jersey's increased urbanization is also a contributing factor to the decline of this species.



Cliff swallow nest sites.

**Management Techniques and Protective Measures:** Cliff swallows are beneficial to farmers. Their increase should be encouraged. To properly manage a gregarious species such as this, a reliable census of present populations is essential. It is hoped that the banning of toxic insecticides such as DDT will help improve conditions for a comeback. Decreases in the number of barns in New Jersey have made suitable habitat scarce. Programs to make existing structures suitable, such as nailing a narrow strip of wood to barns just below the eaves, and other similar measures should be promoted.

**Recommendations:** None.

## SHORT-BILLED MARSH WREN

*Cistothorus platensis*



Short-billed Marsh Wren

B. D. Cottrille, Cornell Lab. of Ornithology

**Distinguishing Characteristics:** The short-billed marsh wren is the smallest wren that breeds regularly in New Jersey. The plumage on the upper parts is streaked with shades of brown and pale brown. The upper parts are white with a wash of pale cinnamon across the breast. The head appears streaked in comparison to the black head and white eye strip of the long-billed marsh wren. The short bill of this bird is characteristic but not easily observable.

**Distribution and Habitat:** These birds are inhabitants of the drier portions of brackish marshes and wet inland meadows. They are usually associated with sedges and grasses. The east coast breeding range of the short-billed marsh wren is from central Maine to northern Delaware. These birds usually arrive in New Jersey in late April and leave in late September, though some may winter in the state.

**Status:** Threatened (State). The short-billed

Short-billed marsh wren  
breeding range.



marsh wren has always been scarce. Its elusiveness and retiring habits make it rather difficult to observe. In recent years it appears to be declining and is not found at its usual nesting locations.

**Management Techniques and Protective Measures:** One of the principal causes of the apparent decline has been loss of habitat. The Wetlands Act in New Jersey has provided the tools for better protection of this species, and the Coastal Area Facility Review Act (CAFRA) aids in protecting the specialized habitat of this bird.

**Recommendations:** Regulation of coastal wetland modifications should take into account impacts on the declining songbird species historically found there. Appropriate construction permits should be issued only after proper habitat analysis. A survey should be conducted of existing short-billed marsh wren habitat, enlisting the services of private individuals and organizations.

## BOBOLINK

*Dolichonyx oryzivorus*

**Distinguishing Characteristics:** The spring male is one of the few birds with a black underside and a pale upper side. The warm buff color of the underparts of females and fall males coupled with the thin streaking and the boldly striped head readily identify the bobolink in migration. The frequently heard "spink" call note indicates that vast numbers of this species pass overhead during early fall nights.

**Distribution and Habitat:** This bird breeds from southern Quebec and Manitoba to New Jersey and northern Missouri. It winters in South America. As breeding birds, bobolinks are largely restricted to the northwest quadrant





Bobolink O.S. Pettingill, Cornell Lab. of Ornithology

of the State though they have occasionally been reported in various parts of the state, such as Cape May. Grassy fields of medium height and hayfields, especially alfalfa fields, are prime nesting habitat. Migrants can be found over a much wider choice of habitat. Bobolinks rarely arrive before early May and are almost entirely gone by late September.

**Status:** Threatened (State). The loss of farmland to development and early cutting of hay have greatly reduced the population of this species. Because it is at the southern edge of its breeding range in New Jersey it is even more susceptible to adverse pressures.

**Management Techniques and Protective Measures:** A program for preservation of farmlands is crucial to this species. Later mowing (after the young have fledged) is also important and should be encouraged in fields of known nesting activity. This species is protected under Federal and State law.

**Recommendations:** None.

## SAVANNAH SPARROW

*Passerculus sandwichensis*

**Distinguishing Characteristics:** Savannah sparrows usually attain a length of 4¾ inches (12 cm). This sparrow is marked by a heavily streaked breast, which lacks a central dark spot, and by a short notched tail. When present, the pale yellow line over its eye is also a good field mark. The song is short, buzzy, and insect-like.



Savannah Sparrow

B. D. Cottrille

**Distribution and Habitat:** The savannah sparrow's breeding range extends from Labrador and Hudson Bay south to Pennsylvania, Long Island, and New Jersey. As a breeding bird in this state, it is restricted to extensive short grass fields or relatively dry short grass salt marshes. Considerable numbers formerly bred in suitable habitat from Newark Bay south along the shore and in farm fields in other parts of the State. It is an abundant migrant and a common wintering species in New Jersey.

The bobolink nests in the northwestern part of the state.



The Savannah sparrow is a sporadic breeder in these breeding ranges.





**Status:** Threatened (State). The rate of decline of the savannah sparrow as a breeder seems to have exceeded the rate of alteration or loss of its nesting habitat.

**Management Techniques and Protective Measures:** No specific management has yet been undertaken in this State for this sparrow species. A study is needed of this species as a breeder in New Jersey.

**Recommendations:** None.

## IPSWICH SPARROW

*Passerculus princeps*

**Distinguishing Characteristics:** This subspecies closely resembles the savannah sparrow in color and pattern but is generally far paler and somewhat larger (5½ inches or 14 cm).



Ipswich Sparrow

C. Decker

**Distribution and Habitat:** The grassy seashore dunes from Massachusetts to Georgia are the sole wintering habitat of this bird. It is a migrant and wintering bird in this state. Reluctant to fly when disturbed, it usually escapes by running through the dune grasses. It breeds only on Cape Sable Island off Nova Scotia.

The Ipswich sparrow winters along the east coast.



**Status:** Threatened (State). The only apparent reason for the decline of Ipswich sparrow is the loss of its dune habitat to construction.

**Management Techniques and Protective Measures:** The management needed to protect this species is protection of the remaining grassy sand dunes.

**Recommendations:** None.

## GRASSHOPPER SPARROW

*Ammodramus saviarum*



Grasshopper Sparrow

M. Tremaine, Cornell Lab. of Ornithology

**Distinguishing Characteristics:** This is a small (4½ inches or 12 cm), bobtailed, flat-headed sparrow with a streaked crown and unmarked underparts. The upper back and nape are uniquely streaked with white and rust. The song is short and buzzy, remarkably like a grasshopper's sound.

**Distribution and Habitat:** This species occurs throughout the continental United States. It is scattered throughout the state excluding the Pine Barrens. Breeding areas are few and far between except for the grassy farm fields of the western half of the state. In the eastern portion of the state airfield edges and wildlife management areas are the last refuges for this species. Its apparent scarcity as a migrant may be partly due to its inconspicuousness. Winter birds are seen casually.

**Status:** Threatened (State). The disappearance of the grassy fields needed for breeding is the apparent cause for decline. Wherever even small patches of grass of the required height remain or develop this species occurs. Hence, protection of fields and control of vegetational succession are keys to its survival.

**Management Techniques and Protective Measures; Recommendations:** None.

Grasshopper sparrow  
breeding range.



## HENSLOW'S SPARROW

*Passercherbulus henslowii*

**Distinguishing Characteristics:** The Henslow's sparrow is a small (4½ inches or 12 cm), bob-tailed, big-headed sparrow. The grayish-black, striped head and olive hinderneck contrasting with the brown back are characteristic. The bird also has rufous wing patches and thinly streaked sides.



Henslow's Sparrow

B. D. Cottrille, Cornell Lab. of Ornithology

**Distribution and Habitat:** The Henslow's sparrow may be found in the United States from South Dakota to Texas and eastward to the Atlantic coast. This species inhabits either dry grassy fields dotted with small bushes or bushy damp marsh edges with a high percentage of sedges. The marsh can be either tidal or fresh water. It is both rare and inconspicuous as a migrant and unknown to winter in New Jersey. The breeding grounds, where the sparrow gave its "tsick" note over and over just after sunset or before dawn, were the only places it was regularly seen in New Jersey. In the marsh

habitat, the Henslow's sparrow was usually found in association with the short-billed marsh wren. The sparrow has always been rare and local. Traditional nest areas were in southern Sussex County, in Middlesex County near Bound Brook, the western edges of the marshes at Manahawkin, the lower Delaware Bay shore, and the fields near Hopewell. All these sites now appear unoccupied.

**Status:** Threatened (State). The habitat is much reduced, but enough remains to support more pairs than are now reported. The species' disappearance began before the peak of habitat destruction.

**Management Techniques and Protective Measures:** None.

**Recommendations:** Study is needed promptly to determine more about the Henslow's sparrow's life history and distribution in New Jersey.

These traditional nesting sites  
of the Henslow's sparrow now  
appear unoccupied.



## VESPER SPARROW

*Poocetes gramineus*



Vesper Sparrow B. Dyer, Cornell Lab. of Ornithology

**Distinguishing Characteristics:** The vesper sparrow is a relatively large sparrow (5½ to 6 inches or 14 to 15 cm) with a white eye-ring, a reddish-brown shoulder patch, and a broad, buffy, streaked band across the chest. This is the only brown sparrow with white outer tail feathers.

**Distribution and Habitat:** This species ranges across the United States, breeding north to the Gulf of St. Lawrence. The breeding habitat is grassy fields with adjacent hedgerows and often some bare ground nearby. It has been recently theorized that the bare ground is used as a singing territory. Although the vesper sparrow was once fairly common as a breeder in farm country throughout the State, there are few remaining breeding pairs. It is an uncommon migrant and rare wintering bird in this State. The migratory and winter habitats are not so restrictive.

**Status:** Threatened (State). While much farmland has gone for development, some sizable acreage remains, certainly far more than is needed to sustain a small breeding population even considering the most restrictive determi-

Once found in farm country throughout the state, there are few remaining breeding pairs of vesper sparrow.



nations of its breeding habitat. Prompt study is needed to understand the reasons behind this sparrow's decline.

**Management Techniques and Protective Measures:** All songbirds are protected by Federal law. These species are also protected by the State Endangered Species Act. No specific management has yet been undertaken in New Jersey for this sparrow species.

**Recommendations:** None.



## INDIANA BAT

*Myotis sodalis*



Indiana Bat

N. J. Endangered & Nongame Species Project

**Distinguishing Characteristics:** The Indiana bat is a tiny gray-black mammal, measuring 1½ inches (4 cm) in length with a wing span of 3 inches (8 cm). This rare bat is easily confused with the little brown bat in the field. The chief identifying feature of the Indiana bat is a slightly keeled calcar and short hairs on the toes. The bat hibernates during the winter months, characteristically hanging in “clusters.”

**Distribution and Habitat:** Although its presence in New Jersey has not been recently documented, a specimen tentatively identified as an Indiana bat was taken from a mine in Morris County in the early 1950's. The Indiana bat occurs in the neighboring states of Delaware, Pennsylvania, and New York, and its presence in New Jersey is suspected. Several limestone caves in northern New Jersey meet the basic habitat requirements of this bat: high humidity, relatively constant winter temperature, availability of flat surfaces for clustering, proximity to a major river system, and concentration of caves in a small area.

**Status:** Endangered (Federal and State). The major cause of the decline of the Indiana bat is not clearly understood. However, loss of caves through permanent flooding, human disturbance, changes in land use, and other factors has

In the early 1950's, a specimen tentatively identified as an Indiana bat, was collected from a mine in Morris County.



contributed to the decline of this bat. The Indiana bat is also a Federal endangered species.

**Management Techniques and Protective Measures:** A census of the limestone caves and mine shafts of northern New Jersey will determine if the Indiana bat is present in the State. Caves are visited during the hibernation period which extends from November through March. Inaccessible caves should be revisited in the spring when special traps can be used to capture bats for identification as they emerge from the hibernaculum. Adequate protection should be afforded any hibernation caves found to harbor Indiana bats.

**Recommendations:** None.



N. J. Endangered & Nongame Species Project  
This limestone cave in northern New Jersey represents bat habitat requirements.

## Marine Reptiles and Mammals

This section discusses marine reptiles (sea turtles) and mammals (whales) that are considered special cases. Special case refers to species not known to breed regularly in New Jersey but that do occur off our shores—some occurring with regularity close to our shores or in our bays.

All marine reptiles found in American waters are protected under the Federal Endangered Species Act of 1973 because of overharvest and an extreme loss of critical nesting habitat.

Sea turtles are rarely found on land and when found, they are clumsy and vulnerable. Female sea turtles coming up on the beach to nest have been exploited for centuries. Natural predation on the eggs and young is compounded by human scavengers and poachers. Egg collecting by man is so extensive that at some historic turtle nesting beaches, governments have set up round-the-clock guards to protect the eggs during the nesting and gestation seasons.

In colonial days species such as the right whale were commonly seen off the New Jersey coast. The slower moving whales initially suffered the most from early whaling activities. Modern whaling technology, beginning with fast steamships have made all these tremendous mammals, endangered species. International efforts have been undertaken to regulate the harvesting of these sea mammals.

The following information about the populations of marine mammals and reptiles was obtained through the scientific study of their biology, analysis of whaling records, and examination of beached or stranded animals.

### ATLANTIC GREEN TURTLE

*Chelonia mydas*

**Distinguishing Characteristics:** Atlantic-green turtles have been recorded as weighing up to 850 pounds (386 kg). Today such record turtles are extremely rare. This is the only sea turtle with 4 large side plates on each side of a smooth-edged carapace. The upper shell is also smooth, without the ridge common in other sea turtles. The scales fit neatly next to one another. The carapace is various shades of brown, sometimes shaded with olive or with rings of darker tones radiating from the upper posterior end. Brown plates on the appendages are broadly bordered with light yellow. Dorsal areas of the limbs and neck not covered by plates are a tawny color like the shell, becoming darker near the tips. Males possess a longer carapace and thicker tail than females. This turtle is still being exploited heavily for its eggs, meat, and shell products. These turtles are totally vegetarian, feeding mostly on seaweeds in temperate waters.

**Distribution:** The extreme limits of its range in the Atlantic are north to Massachusetts and south to northern Argentina. The green turtle travels 1,400 miles (2,253 km) from feeding to nesting grounds.

**Status:** Refer to the Atlantic leatherback.

### ATLANTIC HAWKSBILL

*Eretmochelys imbricata imbricata*

**Distinguishing Characteristics:** The shell of an Atlantic hawksbill, prized for its beauty, has a marbled pattern of browns and yellows on each scale. The head shows a pattern of dark blotches surrounded by a margin of cream or yellow in the center of each scale. The jaw is one solid piece and is beaklike, hence the name hawksbill. The dorsal scales overlap each other and end in sharp pointed edges. There is a rift (or keel) formed along the center of the carapace by projections of the central dorsal plates and, occasionally along the sides. These relatively small sea turtles now attain only a maximum weight of approximately 100 pounds (45 kg). They have been recorded in the past up to 280 pounds (127 kg).

**Distribution:** This turtle is found mostly in tropical reefs and shallow coastal waters in the warm parts of the Atlantic. It is considered rare in temperate waters. Wherever it occurs it is exploited for both its shell and meat.

**Status:** Refer to the Atlantic leatherback.





Loggerhead



Hawksbill



Leatherback



Green



Ridley

*Carol Decker*

## ATLANTIC LOGGERHEAD

*Caretta caretta*

**Distinguishing Characteristics:** As the name implies, this second largest sea turtle has a very large, broad head. There are many plates upon it as well as two prefrontal plates between the eyes. These turtles have been known to reach a weight of about 1,000 pounds (454 kg), but recently they have not been found over 300 pounds (136 kg). The shell has an elongated heart shape and, except for the concave shoulder area, has a somewhat smooth, oval outline. The dorsal plates do not overlap in adults and do so only slightly in the young. The carapace is a characteristic reddish-brown color occasionally blotched or bordered with olive or yellow. The appendages are typically yellow with upper surfaces a dusky color. Occasionally these turtles swim up estuarine pathways and can be found in the southern inland riverways. This turtle is the most carnivorous of the sea turtles.

**Distribution:** Loggerheads occur primarily in the warm waters of the Atlantic Ocean. They may occasionally appear during the summer as far north as the Canadian maritime provinces and south to Argentina. They regularly nest north to the beaches of the Carolinas. There are a few nest records as far north as Maryland and New Jersey.

**Status:** Refer to the Atlantic leatherback.

## ATLANTIC (KEMP'S) RIDLEY

*Lepidochelys kempi*

**Distinguishing Characteristics:** Smallest of the sea turtles (about 2 feet or 61 cm), the Atlantic Ridley is distinguished by the rounded outline of its carapace and the predominantly gray color of its shell and dorsal skin surfaces. It has two pair of prefrontal plates on its head.

**Distribution:** Its range is chiefly in the Gulf of Mexico. Occurrences have been reported in the summer along the coast to New England and Nova Scotia.

**Status:** Refer to the Atlantic leatherback.

## THE ATLANTIC LEATHERBACK

*Dermochelys coriacea coriacea*

**Distinguishing Characteristics:** Largest of all sea turtles, the leatherback has been recorded as reaching a total length of about 8 feet (2.5 m) and weight of about a ton. The size of recently reported dead and beached specimens ranged from 6 to 7½ feet (1.8 to 2.3 m) and 700 to 1,500 pounds (318 to 681 kg). It is the only sea turtle with a smooth, scaleless, black leathery back. It is marked with 7 narrow raised ridges down the back and 6 along the plastron. It also has a cusp on either side of the upper jaw. This is the only sea turtle that vocalizes, making roaring sounds when in distress.

**Distribution:** Of all sea turtles this one is probably the most common in temperate waters since it feeds almost exclusively in the temperate zone. The leatherback nests along the coast of Florida and on the beaches of the Gulf of Mexico. It ranges chiefly in the warmer parts of the Atlantic Ocean but may occur as far north as Newfoundland during the summer months.

**Status:** All of these sea turtles are endangered except for the Atlantic green turtle, which is threatened. All marine reptiles found in U.S. waters are protected under the Federal Endangered Species Act of 1973 because of overhunting and an extreme loss of critical nesting beaches. The Atlantic loggerhead and green turtle were added to the federal list because of similarities in appearance, meat, and shell products to the hawksbill and leatherback turtles, along with their suffering from the same problems. The Atlantic Ridley is nearly extinct because of the many years of poaching at the one tropical beach at which it nests. International efforts have been initiated to save the dwindling populations by an egg transfer program to a protected site in southern Texas.



## SPERM WHALE

*Physeter macrocephalus*

**Distinguishing Characteristics:** The most distinctive feature of the sperm whale is its large square head. The lower jaw is long and narrow and has about 25 pairs of teeth. It is the largest of the toothed whales. These mammals can range from 38 to 60 feet (12 to 18m), the males usually reaching the greatest length. They can weigh up to 50 tons (46 MT). The flukes are large and triangular with a deep notch in the center. The posterior end of the body has wrinkled skin compared to the smoother head. This whale's color is typically brown but may range into gray.

**Status:** Refer to the right whale.

## BLUE WHALE

*Balaenoptera musculus*

**Distinguishing Characteristics:** The largest mammal on earth, the blue whale has been known to reach a length of 95 feet (29m) and a weight of 10.6 tons (9.7 MT); females are larger than males. The whale gets its name from its mottled blue-gray coloration on both dorsal and ventral surfaces. Large size as well as a smaller dorsal fin and black baleen plates distinguish this from other whales of the same genus. It feeds mostly on krill, a crustacean member of the sea's zooplankton.

**Status:** Refer to the right whale.

## FIN WHALE

*Balaenoptera physalus*

**Distinguishing Characteristics:** The fin whale, second only to the blue in size, resembles the blue whale in features. It grows to between 75 and 85 feet in length (23 and 26 m) and has a gray back, white belly, and large dorsal fin. A curious characteristic of this whale is the black color of its left lower jaw and left baleen plates; the right side commonly being white. These feed on krill but also upon small fish like anchovies.

**Status:** Refer to the right whale.

## SEI WHALE

*Balaenoptera borealis*

**Distinguishing Characteristics:** The sei whale also resembles the streamlined blue and fin whales but is smaller, attaining a maximum size of about 46 feet (14 m). This species has a white belly, but the patch is smaller than that on the fin whale. The dorsal fin is also larger than on the other endangered species of this genus. The undersides of its flippers and tail flukes are dark compared to the white on the other species.

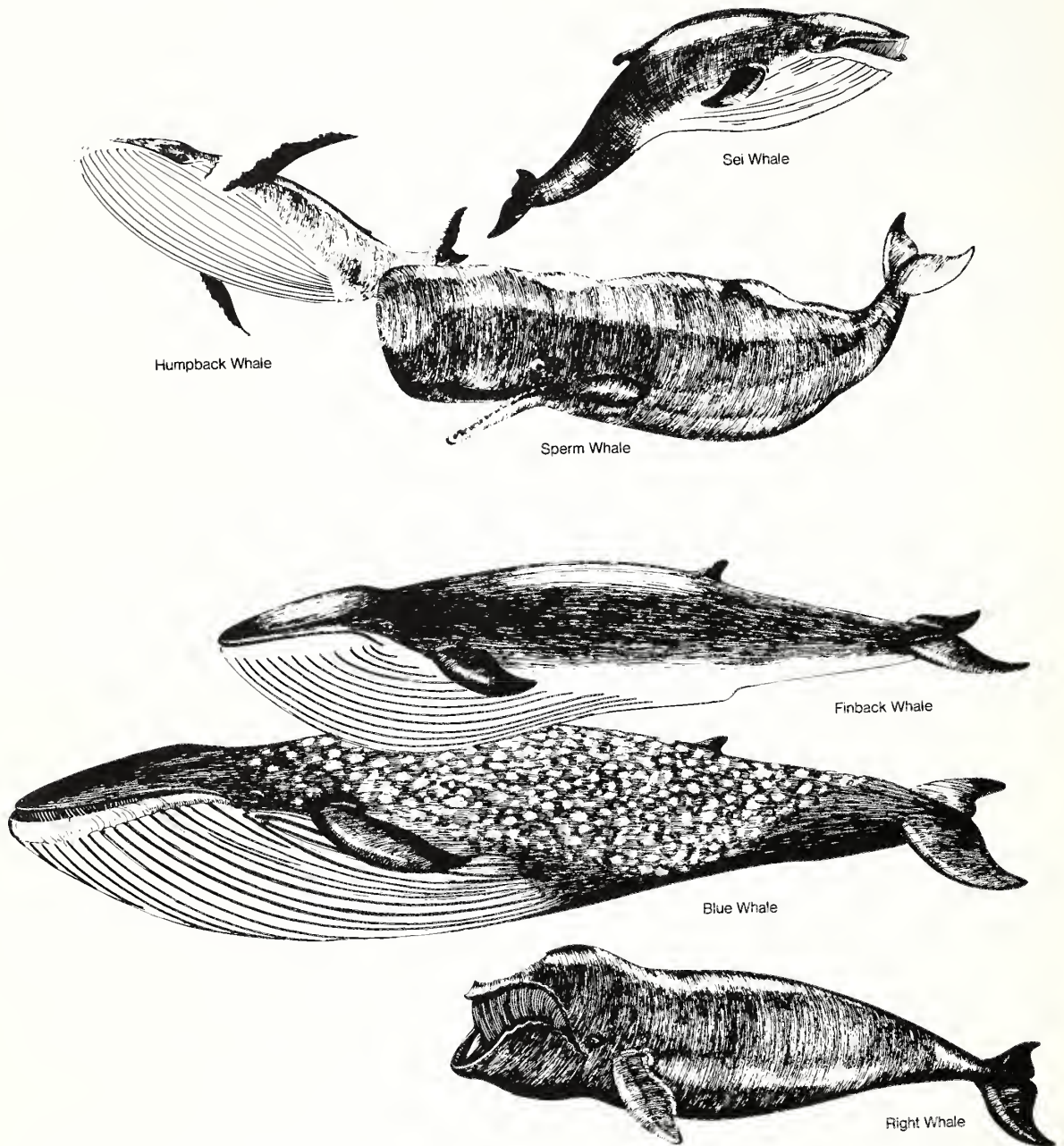
**Status:** Refer to the right whale.

## HUMPBACK WHALE

*Megaptera novaeangliae*

**Distinguishing Characteristics:** At maturity, humpback whales have recently been recorded as being about 40 feet (12 m) in length. They are chunky, heavy-bodied whales. Very long flippers (14 feet or 4 m), a black back, and white underparts are characteristic of these marine mammals. The rear margin at the tail flukes is scalloped. Unusual knobs and bumps appear on the flippers and on the edges of its jaws. Common to this species is an infestation of several species of barnacles and whale lice.

**Status:** Refer to the right whale.





## RIGHT WHALE

*Eubalaena glacialis*

**Distinguishing Characteristics:** The bulky body of a mature right whale can reach up to 59 feet (18 m) in length. This whale has no dorsal fin and has an extremely large head with a narrow arched snout (or rostrum). The whale is deep ebony-black both dorsally and ventrally. Its gentle nature and slow swimming speed caused early whalers to give it its name as the “right” whale to kill.

**Distribution:** All these whales range throughout the Atlantic coastal waters; however, the right whale occurs no further south than the Carolinas.

**Status:** These species of whales are on both New Jersey and Federal lists of endangered species. Just as pesticides have been a common denominator in the decline of birds of prey, overexploitation is the limiting factor shared by marine mammals and sea turtles. International efforts have been undertaken to regulate the harvesting of these sea mammals. The Marine Mammal Stranding Center, a private nonprofit organization located in Gardner's Basin, has a qualified specialist under contract with the Endangered and Nongame Species Project. The center salvages and supervises disposition of stranded or dead sea animals and gathers information on the occurrence of marine mammals and sea turtles on the New Jersey coast.

## GLOSSARY

Anadromous—usually refers to fish which live in saltwater and migrate upstream to freshwater in order to spawn.

Anal fin—an appendage located on the ventral side of a fish near the tail. See Fig. 1.

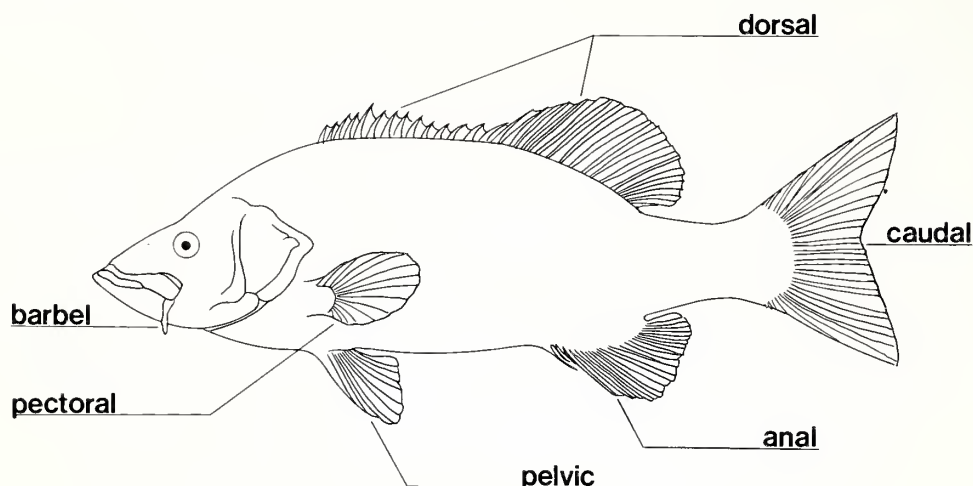


FIG. 1

Baleen—long plates of horny material which hang in rows from the roof of a whale's mouth. These plates have taken the place of functional teeth.

Barbel—a protrusion from the corner of a fish's mouth. See Fig. 1.

Benthic—the bottom sediment zone of a body of water. Usually refers to the organisms resting on the bottom or living in the bottom sediments.

Calcar—a small bone protruding inward from the hind leg along the interfemoral membrane (connecting the hind legs and tail) in bats.

Carapace—the dorsal or upper shell which protects the body of most turtles and tortoises.

Carnivorous—a meat eater; feeding on animal tissue.

Caudal fin—the tail of a fish. See Fig. 1.

Chromosome—a colored, rod-shaped body, in the nucleus of a cell, made up of 2 chromatids that carry genes which convey hereditary characteristics.

DDT—Dichloro-diphenyl-trichloroethane, an insecticide containing toxic residues, which was previously used in agriculture but has been banned.

Dorsal—the top part of an object.

Dorsal fin—an appendage located on the dorsal or upper part of the fish body. See Fig. 1.

Ecosystem—an undefined area where the biotic community and the nonliving environment function together.

Fish ladder—a series of pools of water, arranged in steps so that fish can move upstream over dams.

Fledgling—applied to an altricial bird (young at hatching have eyes closed, are incapable of locomotion and dependent on parents) from the time it leaves the nest until it becomes independent of its parents.

Flukes—the tail of a dolphin or whale which acts as a rudder.

Gynogenesis—process of development in which the embryo contains only maternal chromosomes due to the activation of an egg by a sperm that degenerates without fusing to the egg nucleus.

Hibernaculum—a shelter (e.g. a cave) occupied during the winter by a dormant animal (e.g. a bat).

Larva—the immature or early form of an animal which at birth or hatching is fundamentally unlike its parent and must metamorphose before assuming adult characteristics, e.g., a tadpole.

Lateral—the side view of an object.

Morphological—pertaining to the form and structure of an organism.

Nape—the dorsal or upper part of the neck of a bird.

Pectoral fin—an appendage located anteriorly below the lateral line on either side of the fish body. See Fig. 1.

Pelvic fin—an appendage located on the ventral side of the fish body. See Fig. 1.

Peripheral—said of a species whose occurrence in New Jersey is at the edge of its present natural range.

Plastron—the ventral or lower shell which protects the body of most turtles and tortoises.

Plumage—refers to the feather covering of a bird.

Prefrontal plates—(a) refers to the one or two shields located on a turtle's carapace near the head; (b) refers to the two scales located on the flat dorsal part of a snake's head above the eyes.

Raptor—a predatory bird with a strongly notched beak and sharp talons.

Rookery—the nest or breeding place of a colony of birds.

Snout—the nose or nasal part of an animal. In fish, the snout length is from the eye to the tip of the mouth.

Spawn—the eggs of aquatic animals.

Sphagnum—a genus of moss characterized by its pale green to white clustered heads. This moss grows in wet acid places and decomposes with other plant debris to form peat.

Sympatric—species which occur in the same geographical area. In sympatry, the two species can be easily distinguished from each other in one or more characteristics.

Talon—the claw or nail of the leg of a bird of prey.

Tarsus—the third segment of the pelvic appendage (leg) of birds, between the leg shank (drumstick) and the bases of the toes; the ankle bone.

Triploid—having three sets of chromosomes.

Ventral—the bottom or underside view of an object.

Viscera—the internal organs of animals.

Wrack—marine vegetation or dried seaweeds.

Zooplankton—animal plankton; small, often microscopic animal life floating or weakly swimming in a body of water.



**NEW JERSEY DEPARTMENT OF ENVIRONMENTAL  
PROTECTION  
ENDANGERED & THREATENED SPECIES REPORT FORM**

If any of the species mentioned in this book are sighted, please use this form to report the sighting and location.

Species sighted: \_\_\_\_\_

Where sighted:    Exact location \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Nearest village or city: \_\_\_\_\_

Map attached:      Yes \_\_\_\_\_      No \_\_\_\_\_

Date and time of sighting: \_\_\_\_\_

Age (circle one):                      Immature                      Adult                      Unknown

Number sighted:                      \_\_\_\_\_                      \_\_\_\_\_                      \_\_\_\_\_

Behavior observed (e.g., flying, perched, feeding, breeding activity): \_\_\_\_\_

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Length of time observed: \_\_\_\_\_

Remarks: \_\_\_\_\_

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Name of observer: \_\_\_\_\_

Address: \_\_\_\_\_

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Telephone: \_\_\_\_\_

Date sighting reported: \_\_\_\_\_

Return form to:    Endangered and Nongame Species Project  
New Jersey Division of Fish, Game and Wildlife  
P. O. Box 1809  
Trenton, N.J. 08625



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